40, Rock (c)

POPULAR Computing WEEKLY

FREE GAMES CASSETTES

35p 15-21 September 1983 Vol 2 No 37

This Week

Laser 200
David Aubrey Jones presents an in-depth review of the Hong Kong-built Laser 200 on page 16.

Video titles
Andrew Homer explains how to generate video titles on the BBC micro. See page 33.

Word processor
Dale McLoughlin presents a simple, machine code, word processor for the 48K Spectrum. See page 20.

New releases
All the latest software games including *Apocalypse* from Red Shift and *Perilous Post* from Impact Software. See page 57.

★STAR GAME
Hill St Blues on 48K Spectrum. See page 10.

News Desk

Sinclair's dual-processor

IT now seems likely that Sinclair's new 'professional' computer, scheduled for launch in early 1984, will be a dual-processor machine.

Also it should incorporate a monitor and twin-microdrives, all for around £400.

A twin-processor machine has a number of advantages. If the machine incorporates not only a 68000 chip but, as now seems likely, a Z80 also, then the machine will have a choice of operating modes. It would have the advantages of the 16/32 bit architecture of the 68000, while still being able to run the wealth of software currently available for the Spectrum.

Another advantage would be a multi-user capability, using perhaps Spectrums as stations on a network facility.

Commented Sinclair's managing director Nigel Searle: "You don't want to change all the variables at once. In order to be competitive you have to change, but you want to take

Continued on page 5

Design your own arcade games

QUICKSILVA is to launch the first of an entirely new type of program for the 48K Spectrum at the end of this month.

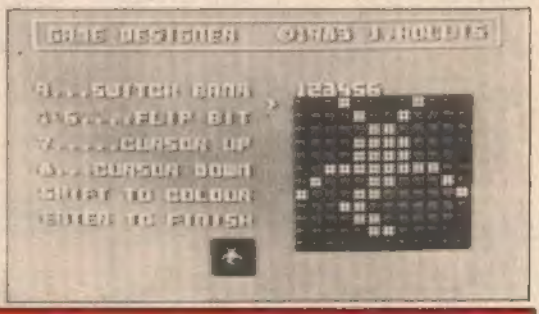
It is a kind of arcade game generator. "Somebody with no programming experience whatsoever should find it easy to make very convincing arcade games out of it," says its author, John Hollis.

The program is menu driven. The way *Games Designer*, as it is called, works is as follows: First, you set the format that the game will take — for example, a character that moves from left to right and fires at the bottom of the screen, or one that sits in the middle of the screen and can be moved around under joystick control firing in any direction, or whatever.

Next, you define as many sprites — moveable graphics shapes of size 12 × 12 pixels — as you want to appear in the game.

After that you specify the

Continued on page 5



Classified Classified Classified Classified

6,000 free tapes to be given away — see page 45

ART ON A BBC?
PRESENTING TWO TOTALLY UNIQUE GRAPHICS SYSTEMS FOR THE BBC MICRO
*OFFERS MANY FEATURES
*SUPERB VALUE
*GRAFKEY — DISK £12.95 OR TAPE £7.95
GRAFSTIK — TAPE ONLY £7.95
Personal Computer News verdict:
"This package could make a worthwhile addition to anyone's program library"
PCN ISSUE 21
Clares Micro Supplies
222 Townfield Road, Wilesford, Cheshire.
Tel: (06065) 51374.

VIC20 OWNERS! Our Rampack Adaptor allows standard software to be run on your expanded system without removing the Rampack. Simply switch your extra memory on or off as needed. Prevents wear to computer Rampack terminals. £12.45 inc. p&p. L. W. Staines & Co., Unit 2, Roding Trading Estate, London Road, Barking, Essex. Tel: 01-591 2900.

VALHALLA

ELKAN ELECTRONICS
NEW! NEW!
NANOS "quick-reference" cards — easier to use than the manuals!
DRAGON 32 £3.95
COMMODORE 64/VIC20 £3.95
SINCLAIR ZX81 £3.50
QUICK-SHOT self-centring joysticks — improve your scores!
DRAGON 32 £14.95
(specially developed for ELKAN)
ATARI 400/800 £12.95
COMMODORE 64/VIC20 £12.95
+ £1 p&p
ELKAN ELECTRONICS, FREEPOST, 11 Bury New Road, Prestwich, Manchester, M25 6LZ. Tel: 061-798 7613

Continued on page 51

NOW AVAILABLE FROM W.H. SMITH

SUPER SPY 48K Spectrum

Locate the secret island hideaway of the mysterious megiomaniac Dr. Death. Follow his trail across continents, through complex puzzles, coded messages and 3-D mazes. Discover the entrance to his underground lair — but beware — even with your death-defying gadgets his evil henchmen may still win the day!

Saving the world may take some time—so we've included a 'save' routine for part-time secret agents!

Credit Card Hotline
06286 63531

Only £6.50

DEALER ENQUIRIES WELCOME — GENEROUS DISCOUNTS

Adventurous Programs always wanted. Please send sample — generous cash payments!

RICHARD SHEPHERD SOFTWARE
ELM HOUSE, 23-25 ELMSHOTT LANE, CIPPENHAM, SLOUGH, BERKS. TEL. (06286) 63531

POPULAR Computing WEEKLY

15-21 September 1983 Vol 2 No 37

SUNSHINE

The Team

Editor
Brendon Gore

News Editor
David Kelly [01-734 2664]

Software Editor
Graham Taylor [01-734 2953]

Production Editor
Lynne Constable

Editorial Secretary
Sarah Owen

Advertisement Manager
David Lake [01-734 0840]

Advertisement Executive
Alastair Macintosh [01-734 3443]

Classified Executive
Diane Davis [01-734 2688]

Administration
Theresa Lacy [01-734 3454]

Managing Editor
Duncan Scot

Publishing Director
Jenny Ireland

Popular Computing Weekly,
12-13 Little Newport Street,
London WC2R 3LD
Telephone: **01-734 1051**

Published by Sunshine Publications Ltd.

Typesetting, origination and printing by Chesham Press, Chesham, Bucks

Distributed by S M Distribution London SW9. 01-274 8611. Telex: 261643

© Sunshine Publications Ltd 1983

ABC

MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

ISSN 0265-0509

How to submit articles

Articles which are submitted for publication should not be more than 3,000 words long. The articles, and any accompanying programs, should be original. It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted.

All submissions should be typed and a double space should be left between each line. Please leave wide margins.

Programs should, whenever possible, be computer printed.

We cannot guarantee to return every submitted article or program, so please keep a copy. If you want to have your own program returned you must include a stamped, addressed envelope.

Accuracy

Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

This Week

News 5, 7
Sinclair goes to China

Letters 9
Chain letter warning

Star Game 10
Hill 5! Blues on 48K Spectrum

Street Life 12
David Kelly talks to Carnell Software

Reviews 16
David Jones looks at the Laser 200

Programming 19
Vic20 gameswriting — part V

Spectrum 20
Word processor by Dale McLoughlin

Commodore 64 27
Blow up by Les Allan

BBC in education 33
Generating video titles

Dragon 35
3D graphics by Ian Barker

Open Forum 37
Five pages of your programs

Adventure 47
Tony Bridge's corner

Peek & poke 49
Your questions answered

New releases 57
Latest software programs

Competitions 59
Puzzle, Top 10, Ziggurat

Editorial

The *Dr Who* game released by BBC Soft comes as a considerable disappointment, both to fans of the tv series and to home computer owners.

If ever there was a subject that cried out for special treatment, it is *Dr Who*. Devised by Terry Nation, the series has been enormously successful round the world since it was first screened back in the 1960s. It lends itself to a full-scale adventure, complete with Daleks and Cybermen, or at least to an innovative arcade game.

Instead, BBC Soft has produced a collection of four tired arcade games and cobbled them together to form the misleading title *Dr Who – The First Adventure*.

Not altogether surprisingly, the BBC was extremely quiet about the release of its *Dr Who* game. There was none of the fanfare of publicity that would have accompanied a more suitable offering.

There are any number of tv shows that could be linked to adventure or arcade games, particularly those shows with cult followings such as *Blake's Seven* and *The Prisoner*. Indeed, future shows may well be designed with the home computer market in mind.

However, if this marriage between tv and computer games is to be successful, there will have to be a vast improvement in quality over *Dr Who — The First Adventure*.

Next Thursday

A version of the popular board game where you must connect four discs together in any direction. Connect Four — next week's star game for the Commodore 64 by Les Allan.

Subscribe to Popular Computing Weekly

I would like to subscribe to *Popular Computing Weekly*
Please start my subscription from the ..... issue.

UK Addresses: ☐ 26 issues at **£9.98** ☐ 52 issues at **£19.96**
Overseas Addresses: ☐ 26 issues at **£18.70** ☐ 52 issues at **£37.40**
Please tick relevant box
I enclose my cheque to *Popular Computing Weekly* for .....

Name .....

Address .....

.....

.....

Please send this form, and cheque, to *Popular Computing Weekly*, Subscription Dept., 12-13 Little Newport Street, London WC2R 3LD.

The world's first true 3D game.

Postern bring you the first fully 3 dimensional stereoscopic game.

by Mike Singleton

3D DEEP SPACE

If you've escaped from the Snake Pit, survived The Siege, ridden the mighty Shadowfax and conquered the fearsome Firehawks – see if you're ready for the ultimate experience.

POSTERN

SPECTRUM
VIC 20
COMMODORE 64
BBC 'B'
£7·95

© FRANK MORRIS

Postern Ltd. P.O. Box 2, Andoversford,
Cheltenham, Glos GL54 5SW.
Tel: Northleach (04516) 666
Telex 43269 Prestel 37745

This game requires a colour television set and the special 3D glasses provided with each game.

Sinclair

Continued from page 1

tried and tested methods with you.

"We have gained a large share of the consumer market through those methods and there is no reason why they cannot be applied to other fields."

For this reason he reckons that Sinclair would be unlikely to adopt a standard operating system for the new machine — such as Digital's VIP (see *Popular Computing Weekly*, September 8).

"I am very anxious not to appear negative about VIP and Personal CP/M — I think they are very impressive, but we will continue to go our own eccentric way."

The new Sinclair machine may well find itself in the same market as IBM's low-cost Peanut machine — soon to be launched. "Obviously slogging it out toe to toe with IBM is something one thinks about very closely," says Searle. "Even so, it is not necessarily true that we will do well by making ours an IBM compatible product.

"We have been fairly successful by being different and we will most likely do the same for any new market."

Sinclair managing director Nigel Searle

Games designer

Continued from page 1

levels of the game, and which sprites are to appear in which level. Each sprite also has a set path through which it moves which can be predetermined — you might set one to spiral down the screen, for example.

In this way, you can make up your own games in a very short space of time. It is also possible to flip sprites, so as to have different sprites with different directions of motion.

Games designer John Hollis

or perhaps a bird with wings that flap.

John says: "You don't have to program a zap game — you could even have a game with a lawnmower and moles.

"If I've got it right, people should be able to design games I haven't thought of."

Games Designer, for the 48K Spectrum, costs £14.95 and comes complete with an explanatory booklet and eight games ready-programmed on the system.

John had been thinking about the program for over a year before getting down to writing it in April. Even so, it was a huge software project and it took him over four months to complete it.

The program is the first to go out under the Software Studios banner, though it will be marketed by Quicksilva. Software Studios is a software laboratory formed jointly by John Hollis and Nick Lambert, Quicksilva's founders. Earlier this year, Rod Cousins took over the day-to-day running of Quicksilva as both John and Nick expressed a wish to get back to programming.

John is now working on the follow-up to his successful *Time Gate* title, while the first program from Nick's part of Software Studios should be out in the new year.

BBC misses out on Dr Who adventure

IT would appear that the BBC has missed an opportunity.

The new BBC Soft title for the BBC machine — *Dr Who, The First Adventure* — is not an adventure at all. Instead, it is a collection of four well-known arcade favourites. The four sections are: a two-dimensional maze, a *Frogger*, a *Galaxians*, and a computer version of the board game *The Black Box*.

Dr Who is the first computer program the BBC has spun-off from a tv series. A number of other software houses had already expressed interest in writing a *Dr Who* adventure, but were turned down by the BBC.

Said BBC Soft's Meyer Solomon: "A graphics adventure would have been a big project and entailed us going into assembly language programming.

"Really, *Dr Who, The First Adventure* is just a taster. The next *Dr Who* program will probably be a far more elaborate program — an adventure, possibly with some graphics and should be ready some time next summer."

Lambda burns its fingers

HONG KONG computer manufacturer, Lambda Electronics, has put its feet into hot water by launching its Lambda 8300 computer.

Sinclair Research is taking legal action against the company in Hong Kong, claiming that the machine is a copy of its ZX81 machine.

Although the 16K Lambda machine is completely different in appearance to the ZX81, its internal circuitry and the majority of its Rom is alleged to be identical.

Interestingly, the Lambda has a number of features that the ZX81 does not. It has a joystick port, a moving-key keyboard, a built-in loudspeaker and *Music* command, an automatic line number function and *Space Invader*-shaped pre-defined graphics keys.

A Sinclair spokesman said: "There have been a number of court appearances in Hong Kong and we are now attempting to get an injunction to halt sales of the Lambda."

The Lambda must be particularly worrying for Timex who will soon launch the TS1500 machine — basically a 16K ZX81 — in the US.

On display at Olympia show

NEXT week's Great Home Entertainment Spectacular exhibition will feature a number of new computer products.

Top of the list must be the new Elan computer, on display for the first time since it was announced last month.

Sinclair Research will show its Microdrive and Interface 1 publicly for the first time.

Mattel will display the computer add-on for its Intellivision games console and its Home Control System for the Aquarius computer. Milton Bradly will exhibit the vector graphics Vectrex games console.

Acorn's Electron will be on show, as will Atari's new 600XL and 800XL machines.

The Great Home Entertainment Spectacular will be held at Olympia, London, from September 17-25. Admission is £3 and £2 and the show will be open from 11.30 am to 9 pm each day except Monday September 19, when the show will open at 5 pm.

FINSBURY COMPUTER CENTRE

25-27 STROUD GREEN ROAD
LONDON N4 TEL: 01-263 0084/4481

NORTH LONDON'S LARGEST MICROCOMPUTER CENTRE
BUSINESS COMPUTERS!
DUET 16 in stock

ATARI 400 £149.00
ATARI 800 £299.99

SINCLAIR ZX81 £45.00
SPECIAL OFFER
SPECTRUM 16K £99.95
SPECTRUM 48K £129.95

COMMODORE VIC20 £149.99
INCLUDING STARTERPACK
COMMODORE 64 £299.00

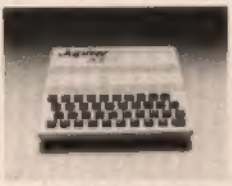
DRAGON 32 £175.00

ORIC-1 48K £139.99

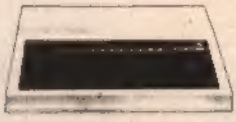
LYNX 48 £225.00

COLOUR GENIE 32K £168.00
SPECIAL OFFER

TEXAS TI 99-4A
£159.95



JUPITER ACE £69.95



BBC MODEL B £399.00

WE CARRY PROBABLY THE WIDEST RANGE OF SOFTWARE PROGRAMS IN STOCK. PLEASE VISIT US FOR DEMONSTRATION ON ANY OF THE ABOVE COMPUTERS. DISK DRIVES, PRINTERS, CASSETTE RECORDERS, MONITORS, SPEECH SYNTHESISERS, LEADS, ETC., ALSO IN STOCK. ALL PRICES INCLUDE VAT. PRICES ARE CORRECT AT TIME OF GOING TO PRESS BUT ARE SUBJECT TO CHANGE.

We cannot list all the software we stock, so pick up the phone and ring 01-263 0084/4481 and ask. We'll be pleased to give you our prices.

Please send off the coupon or order by phone quoting your Access/Barclaycard No. Phone 01-263 0084/4481. Immediate despatch on receipt of order or cheque clearance.

FINSBURY COMPUTERS LIMITED
25/27 STROUD GREEN ROAD, LONDON N4

TO: FINSBURY COMPUTERS LTD
25/27 STROUD GREEN ROAD
LONDON N4

Please supply.....

Please add £3 for p&p to cost

I enclose my cheque for £.....

or charge my
Access/Barclaycard No.....

NAME.....

ADDRESS.....

..... SIGNATURE .....

Chinese move in on home market

CHINA is moving into the home computer market, with help from Sinclair Research.

Nigel Searle, Sinclair's managing director, visited Shanghai and Beijing (formerly Peking) last month. The purpose of his visit was to discuss the feasibility of setting up assembly lines for the ZX81 and Spectrum micros, under the aegis of the South China Computer Company and the China Electronics Import and Export Corporation.

A Sinclair spokesman said that, as a result of Nigel Searle's visit, "Sinclair has now shipped small quantities of ZX81 and Spectrum components for local assembly and

Prism's Bob Denton

sale in China, on a trial basis. It is hoped that, if this initial trial is successful, it will lead to larger quantities of Sinclair personal computers being sold in China over the next few years."

The Sinclair spokesman stressed, however, that discussions concerning the Chinese market were still at a preliminary stage.

The Chinese seem to be extremely keen on the project — a factory in Guangzhou has already been earmarked for the Sinclair scheme and the Beijing Software Academy is working on a program to produce Chinese characters on the Spectrum.

The Chinese are also keen on Micronet 800, Prism's telesoftware service. Richard Hease and Bob Denton of Prism both visited China last month, with a view to setting up a Micronet-type service.

In addition, Prism is to stage a micro trade exhibition in Beijing in November, according to market development manager Steven Wood.

Artic on the offensive

ARTIC Computing has launched its autumn offensive on the software market with the release of 21 new titles.

Ten of the programs are designed for the Spectrum and five each for the ZX81 and Vic20. The final program is *Asteroids* for the 48K Oric.

The Spectrum games include *Jigsaw*, *Road Racers* and *Snake*, the last of which is also available on the Vic20.

Artic, which now has a range of 62 titles, plans to release further programs in October for the BBC, Atari and Commodore 64 machines.

● Arnold Wheatons Software has appointed Artic its sole distributor for a range of Spectrum, BBC and Apple programs including *Angle Turner* and *Weather Station*.

The ultimate

ULTIMATE Play the Game has announced two new titles for the 48K Spectrum.

They are: *Lunar Jet Man*, the follow-up to *Jet Pac*, and *Atic Atac*, a haunted house game where you can choose your own character.

Both will cost £5.50 and be available at the end of September.

Acorn seek quotation

ACORN is to seek a quotation on the Unlisted Securities Market.

Merchant bank advisors Lazards and stockbrokers Cazenoves are handling the proposed share placement, believed to be about 10 per cent which could raise around £6m for the company. A plan at the beginning of the year to raise money through a private share placement has been dropped because of a £3m limit.

Acorn cannot go for a full stockmarket quotation because the company is still less than five years old.

The USM has been very buoyant in recent months with a large number of new technology companies joining. However, feeling in the City now is that the enthusiasm could go out of the market, particularly following the financial troubles of companies like Grundy, ITCS and Dragon.

Problems create problems

SINCLAIR is now manufacturing a Series 3 Spectrum which has cured one problem, only to create another.

The Series 3 machines are indistinguishable from any other Spectrums, except that they have a slightly modified ULA. The change to the ULA has been made to ensure that the machine is compatible with all makes of colour television.

After the Spectrum was launched last year, it became apparent that the computer did not work successfully with some types of tv — some of the Hitachi models, for example.

Unfortunately, while the new ULA solves this problem, its introduction has lead to another difficulty. The new ULA causes some existing software programs written on earlier versions of the Spectrum to crash. The problem concerns the *In* command and it seems that any existing software that calls this routine will not run on the new machines.

A spokesman for Sinclair commented: "The new chip was introduced to overcome the tv problem, and as a very unintentional side-effect the *In* command has been affected.

"We are only aware of one or two cases where it affects software. It looks as though it doesn't happen very often and none of our own software has been affected."

Oric six-slot

A SIX slot mother-board will shortly be available for the Oric 1.

The board, from Kenema Associates, will come complete with ribbon connectors and be supplied with either two or six sockets on-board. Prices depend on the number of sockets, but should be between £35 and £45.

Cards to go with the mother-board include multiple parallel and serial cards and a speech synthesis module (the sort that builds up words from allophones). The speech card will sell for around £49.

The mother-board should go on sale in early October, to be followed by the first of the cards two weeks later.

Kenema Associates is an off-shoot of the Tangerine Users Group, and can be contacted at 1 Marlborough Drive, Worle, Avon.

Sinclair turnover doubles

SINCLAIR Research's pre-tax profits for the year to March 31, 1983, stood at £14.03m. This compares favourably with the previous year's £8.55m profits.

Turnover doubled from £27.17m to £54.53m, while earnings per share rose from 106p to 207p.

Chairman, Sir Clive Sinclair, called the figures "encouraging", but admitted the company had met some problems. "In particular the US market, which we serve through our technology and name licensing agreement with Timex, has been badly affected by a price war since Christmas which has driven the market leaders into heavy losses and resulted in a much lower sales volume in money terms than we expected.

Sir Clive Sinclair

"Fortunately, the UK market proved better than anticipated which partly compensated."

Sir Clive revealed that the company planned to introduce products in new market areas and noted: "We expect to be leaders in the flat screen television field where we are confident that we have the best technology."

● Prism Microproducts, Sinclair's UK distributor, announced that turnover in the first year of its operation totalled £10m. Pre-tax profits were a rather more modest £234,000.

ZX81 16k SPECTRUM 48k DRAGON 32

£5.00 Backed by an Annual "Championship" Competition

"Volcanic Dungeon is one of the better adventure games currently on the market."

– Popular Computing Weekly, Vol 1, No 16.

ZX81 16k SPECTRUM 48k

£7.50 Six action packed programs.

"... and excellent graphics adventure and a well-thought-out package."

– Sinclair User April '83.

CARNELL SOFTWARE

SIMPLY THE BEST ORIGINAL ADVENTURES ON THE MARKET

NAME.....

ADDRESS.....

.....

.....

SEND TO: CARNELL SOFTWARE LTD, NORTH WEYLANDS INDUSTRIAL ESTATE, MOSELEY ROAD, HERSHAM, SURREY KT12 3PL

QUANTITY	ITEM	ITEM PRICE	TOTAL
	VOLCANIC DUNGEON ZX81 16K	£5.00	
	VOLCANIC DUNGEON SPECTRUM 48K	£5.00	
	VOLCANIC DUNGEON DRAGON 32	£5.00	
	BLACK CRYSTAL ZX81 16K	£7.50	
	BLACK CRYSTAL SPECTRUM 48K	£7.50	
		FINAL TOTAL	

LETTERS

Open Forum entries

As a relatively new, but keen, reader of *Popular Computing Weekly*, I am interested in the possibility of submitting programs to Open Forum. However, I have, as yet, no printer for my Vic20, and am wondering whether entries for Open Forum have to be sent in the form of a computer print-out, or can be submitted in some other way.

A R Jenns
58 Endhill Road
Kingstanding
Birmingham B44 9RP

We get a number of queries on how to submit programs to *PCW*, so a brief resume of the procedure seems to be in order.

Firstly, please do include a print-out (remembering to put a fresh ribbon in the printer) of the program. It is also helpful to have a copy of the program on tape, but do not forget to keep a copy for yourself. Always state which computer the program is for (you would be surprised how many people forget to include this information), and how much memory it takes up. A brief description of the program and how it works is essential — it is not enough to say that the workings of a program are obvious or covered in Rem statements.

Finally, include your name and address on the tape and the print-out as well as the accompanying notes. Also, please include a SAE if you want the tape returned.

In praise of Piman

I think P Devereau (Letters, *PCW* 11-17 August) should be forcibly suppressed. How dare he insult Automata's wonderful advertising. Their back page is the first thing I turn to every week — in fact, it's the main reason I buy your magazine.

The Piman and his friends are never too busy to reply to your letters and when you meet them at exhibitions they are always having a party for their customers. I am never disappointed with their games, which are always delivered by return of post — the last one had a free pound note present in it.

Don't be such a misery, P Devereau. Automata are the only people who can make you laugh while you enjoy their programs. Like the Piman says in his free hit song "Give it a try man".

Karen Ross
109 Honeysuckle Road
Bassett
Southampton

We think the Piman deserves some praise too.

Home-brew program

After being interested in computing for some time, I acquired my first computer a couple of weeks ago — a Sinclair 16K Spectrum.

After non-stop programming for a week, I started to write my first home-brew program, "a dx propagation predictor". All amateur radio operators will know what I mean by "dx".

I have only completed one part of it and it is working successfully. I decided to delay the other parts and start on a radio ham log book program. I got all the main material written down and working and I was very pleased with myself, until it came to saving the information without saving the actual program all the time. Have you a solution to my problem.

As you may now have gathered, I'm trying to use my computer in conjunction with my other hobby, short-wave listening, and with any luck actually operating my own station. Also, have you any other correspondents with ZX Spectrum computers who are "Hams" or "SWLs" and, if so, do they know of any decent programs?

Paul Martin (16)
18 Wilkinson Close
Temple Hill
Dartford
Kent DA1 5JT

PS. I have just started to write my own program and I would like to know how to make the screen scroll laterally, so that it looks as if a plane is moving horizontally when really the scenery is moving.

I do not have any programs on tap to solve your problems, but our readers may be able to send in some solutions.

We hope to be doing some material on micros and radio in the near future.

Scrabble words

Regarding Steve Freedman's letter (Scrabble warning, *PCW* 1-7 September), I have written the following routine to print the basic forms (ie, no -ed, -s, -ing, etc) of all the words in the Scrabble dictionary.

To use the routine:
Clear 24499
Load "C" Code (from Scrabble tape)
Clear 40999
then Run the accompanying program.

Paul Ockenden
61 Albourne Close
Brighton
East Sussex BN2 5FX

```
 100 LET l=2
 150 LET f=0
 200 LET a=40222
 250 IF a>=40302 THEN LET l=3
 251 IF a>=41382 THEN LET l=4
 252 IF a>=45640 THEN LET l=5
 253 IF a>=50959 THEN LET l=6
 254 IF a>=53855 THEN LET l=7
 255 IF a>=59555 THEN LET l=8
 270 INPUT ;
 300 IF PEEK a=0 THEN PRINT : LE
T a=a+1: GO TO 300
 310 IF PEEK a>100 THEN GO TO 5(
0
 315 IF f=1 THEN LET a=a-1: LET
f=0
 320 FOR b=a TO a+l-1
 330 PRINT CHR$ PEEK b;
 340 NEXT b
 345 PRINT
 350 LET a=a+l
 360 GO TO 250
 500 LET w=INT (PEEK a/100)
 510 IF w=1 THEN LET x=PEEK a-1:
: LET x=x/4
 520 IF w=2 THEN LET x=PEEK a-1(
: LET x=x/4
 525 DIM a$(w)
 530 FOR b=1 TO w
 540 LET a$(b)=CHR$ PEEK (a+b)
 550 NEXT b
 600 FOR b=1 TO x
 610 PRINT a$;
 620 FOR c=1 TO (l-w)
 630 PRINT CHR$ PEEK (a+w+c);
 640 NEXT c
 645 PRINT
 650 LET a=a+(l-w)
 660 NEXT b
 665 LET a=a+1+w
 670 GO TO 250
```

Unwanted chain letters

It appears that someone is using the names and addresses of contributors appearing in your Letters page to promote a chain letter scheme; and you may possibly share my view that you should do what you can to discourage such exploitation in the interests of your own reputation.

I am enclosing a letter I received today which I believe was prompted by the appearance of my own name and address in your issue of 1-7 September. First, there are the specific references to home computers; secondly, the envelope bears a post code I never bother to give when completing, say, coupons from computer mags.

Perhaps you may wish to consider whether it is a good idea to give full addresses — particularly when they often pin-point the location of valuable computer hardware.

John Ransley
East Sussex

We have received several complaints that someone is circulating a chain letter, using name and addresses taken from our Letters page. Anyone who receives such a letter should either send it to us or throw it away immediately.

Our policy on publishing full names and addresses has always been to show that the letters are genuine and that the writers are not afraid of being identified with the views they have expressed. At the same time, we have always witheld full addresses where requested to do so.

However, if people writing letters to *PCW* are bombarded with unsolicited material such as chain letters, we shall be forced to stop publishing any full addresses.

Hill St Blues

A new game for 48K Spectrum by A Follin and E Page

This program is rather unusual in that it is a fast-moving arcade-style game for two players in Basic.

One player takes the role of a New York cop, the other takes the role of an infamous villain whose idea of fun is knocking down old ladies in his Ford Mustang. Naturally, the cop has devoted his working life to putting an end to the villain's reign of terror.

The main program is a loop which involves key tests, updating car positions and checking for crashes, etc. This loop contains a machine code subroutine for scanning the keyboard which places the values read in locations 60001 to 60004. The main loop then uses these values for changing the cars' positions and directions. The other subroutines are called from this loop in the event of a crash.

Program notes

Lines	
40-60	Clear memory for m/c subroutines, call subroutines for initialising and printing instructions
90-290	Main loop
120-147	Call m/c keyscan routine and update accordingly
150-250	Move cars and check for crash, etc
260-290	Check if pedestrian on screen. If not, and random number is greater than .7 then randomise new position
700-740	Suspend cop for ten goes and return to start position
800-890	End game, print score, prompt user for next game
9000-9150	Initialise. POKE in m/c routines and UDGs
9500-9760	Print titles, plays theme tune, print instructions, set up screen and game variables

After each game is finished, options are given to see the instructions again or not. If so, a jump is made to line 9590. This is in the middle of the instruction routine and cuts out the opening titles.

Machine Code Routines

59000-59015	Attribute change. Location 60000 contains the value of the screen attributes as on page 198 of the Spectrum manual
59020-59068	Keyscan routine. Checks all eight rows for left and right keys pressed and places resultant values in locations 60001-4
59070-59082	Check keys for setting up roadblock. If key pressed, BC register contains 1 on return else it contains 0
60000	Attributes
60001	Police car turns left
60002	Police car turns right
60003	Villain's car turns left
60004	Villain's car turns right

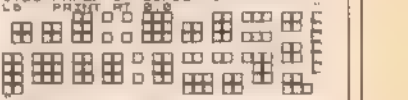
```
  0 REM @ DEMON SOFTWARE 1983
  1 REM
 10 REM ************************
 20 REM ***  MILL ST.BLUES  ****
 30 REM ************************
 40 CLEAR 45999
 50 GO SUB 9000  REM INITIALISE
 60 GO SUB 9500  REM INSTR
 70 REM
 80 REM ************************
 90 REM ***  MAIN SECTION  ******
100 REM ************************
110 PRINT #1; FLASH 1; INK 7; P
APER 0;AT 0,11;"GET READY"; FOR
I=8 TO 0 STEP -1: PRINT #1,AT 1,
15,1; BEEP .5,I-8: NEXT I: PRINT
#1;AT 0,11;"                "
120 FOR I=60001 TO 60004: POKE
1,0: NEXT I: RANDOMIZE USR 60026
130 LET PCD=PCD+(PEEK 60002)-(P
EEK 60001): LET RCD=RCD+(PEEK 60
004)-(PEEK 60003)
131 IF USR 60070=0 THEN GO TO 1
40
132 IF BLOCKS=0 THEN GO TO 140
133 LET DROP=1: LET BLOCKS=BLOC
KS-1
140 IF PCD=5 THEN LET PCD=1
142 IF PCD=0 THEN LET PCD=4
145 IF RCD=0 THEN LET RCD=4
147 IF RCD=5 THEN LET RCD=1
149 IF SUS=0 THEN LET SUS=SUS-1
: PRINT #1;AT 1,0;("                AND SUS=01
  FOR J=1 TO 15: NEXT J: GO TO 2
00
150 LET X=PCX: LET Y=PCY: LET X
=X+(PCD=2)-(PCD=4): LET Y=Y+(PCD
=3)-(PCD=1)
155 IF X<=1 OR X=32 OR Y<=1 OR
Y=23 THEN GO TO 700
160 IF Y=RCY AND X=RCX THEN GO
TO 800
170 IF ATTR (Y,X)=5 THEN LET BL
OCKS=BLOCKS+1: GO TO 190
180 IF SCREEN$ (Y,X)<>" " THEN
GO TO 700
190 PRINT INK 7;AT PCY,PCX," ";
AT Y,X;CHR$ (143+PCD)
195 IF DROP=1 THEN PRINT AT PCY
,PCX;INK 0;"w": LET DROP=0
197 LET PCX=X: LET PCY=Y
200 LET X=RCX: LET Y=RCY: LET X
=X+(RCD=2)-(RCD=4): LET Y=Y+(RCD
=3)-(RCD=1)
205 IF X<=1 OR X=32 OR Y<=1 OR
Y=23 THEN GO TO 800
210 IF Y=PCY AND X=PCX THEN GO
TO 600
220 IF ATTR (Y,X)=5 THEN GO TO
800
230 IF SCREEN$ (Y,X)<>" " THEN
GO TO 600
240 IF Y<BY AND X=BX THEN LET Y
EARS=YEARS+1
250 PRINT INK 2;AT RCY,RCX;" ";
AT Y,X;CHR$ (143+RCD): LET RCD=V
: LET RCX=X: LET YEARS=YEARS+.1
260 IF BIDD=1 THEN LET BC=BC-1:
IF BC=0 THEN LET BIDD=0
270 IF BIDD=1 THEN GO TO 130
275 IF AND .7 THEN GO TO 120
280 LET B(CO)=1: LET CO=CO+1: LE
T BX=INT (RND*32+1): LET BY=INT
(RND*22+1): IF SCREEN$ (BY,BX)
<>" " THEN GO TO 280
290 PRINT FLASH 1; INK 4;AT BY,
BX;"A": GO TO 120
700 REM ************************
710 REM ******  COP CRASH  *******
720 REM ************************
730 IF ATTR (X,Y)=6 THEN PRINT
AT Y,X;" ": LET BIDD=0
740 PRINT AT PCY,PCX;" ": LET D
C=0: LET PCX=22: LET PCD=2: LET
SUS=10: PRINT AT 0,0; INK 2;"@";
PRINT #1,AT 1,0; FLASH 1;" COP
SUSPENDED FOR 10 GOES ": GO TO 2
00
800 REM ************************
810 REM *****  ROBBER CRASH  *****
820 REM ************************
830 PAPER 2: INK 7: BORDER 2: C
LS
840 PRINT AT 10,0;
```

NICKED

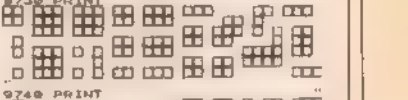
```
850 PRINT AT 10,0;" YOU GOT SENT
ENCED TO ";INT YEARS;" YEARS"
860 PRINT BRIGHT 1; FLASH 1;AT
21,0;"PRESS ANY KEY FOR ANOTHER
GAME": PAUSE 0
870 INPUT "DO YOU WANT INSTRUCT
IONS (Y/N)";LINE A$
880 IF A$="Y" OR A$="y" THEN GO
SUB 9500: GO TO 100
890 GO SUB 9710: GO TO 100
9000 REM ************************
9010 REM *****  INITIALISE  *******
9020 REM ************************
9030 PAPER 6: INK 1: BORDER 5: C
LS
9040 RESTORE 9050: FOR I=60000 T
O 60015: READ A: POKE I,A: NEXT
I: REM ATTRIBUTE CHANGE ROUTINE
9050 DATA 58,98,234,33,0,88,17,1
,88,1,0,3,119,237,176,201
9060 FOR I=60020 TO 60086: READ
A: POKE I,A: NEXT I: REM KEY TES
T ROUTINE
9070 DATA 62,240,219,254,203,71,
40,11,203,79,32,12,62,1,50,98,23
4,24,5,62,0,50,98,234
9080 DATA 62,16,219,254,203,79,4
0,11,203,71,32,12,62,1,50,160,23
4,24,5,62,0,50,98,234,201
9085 FOR I=60070 TO 60082: READ
A: POKE I,A: NEXT I
9087 DATA 1,0,0,62,240,219,254,2
03,87,192,14,1,201
9100 DIM A(15): DIM B(15): FOR I
=1 TO 15: READ A(I),B(I): NEXT I
: REM TUNE
9110 DATA 5,.6,4,.25,5,1.25,0,.6
,4,.25,0,1.25,0,.6,4,.25,0,.6,4,
.25,0,.25,4,.25,0,.6,4,.25,5,1.2
5
9120 FOR I=USR "A" TO USR "F"+7:
READ A: POKE I,A: NEXT I
9130 DATA 124,124,66,124,108,124
,124,124,0,0,255,251,236,251,255
,0,124,124,124,124,108,66,124,12
4,0,255,223,215,223,255,0,0
9140 DATA 124,124,66,124,124,124
,124,124,0,0,255,251,251,251,255
,0,124,124,124,124,124,66,124,12
4,0,255,223,223,223,255,0,0
9150 DATA 255,129,129,129,129,12
9,129,255,0,0,126,66,165,165,0,0
,24,60,24,60,66,66,64,192
9160 RETURN
9500 REM ************************
9510 REM *****  INSTRUCTIONS  *****
9520 REM ************************
9530 PRINT AT 3,0;
```

ALL ST BLUES

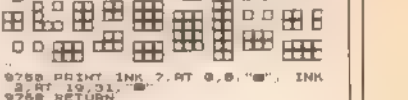
```
AT 10,0;
9535 LET BEEP=.1: FOR I=30 TO 0
STEP -1: PRINT AT 0,I: BEEP BEEP
.1,I: BEEP BEEP=BEEP: NEXT I
: PRINT AT 5,0;
9537 FOR I=1 TO 20: NEXT I
9540 FOR I=1 TO 15: BEEP B(I),A(
I): NEXT I
9550 LET COLOR=40: PRINT AT 20,1
;"PRESS ANY KEY FOR INSTRUCTIONS
"
9560 IF INKEY$="" THEN GO TO 95
90
9570 POKE 60000,COLOR: RANDOMIZE
USR 60000: LET COLOR=COLOR+1: I
F COLOR=48 THEN LET COLOR=40
9580 FOR I=COLOR TO COLOR-20 STE
P -10: BEEP .005,I: NEXT I: GO T
O 9560
9590 PAPER 0: BORDER 0: INK 6: C
LS
9600 LET A$=
    This is a game for 2 players,
one a cop and the other an evil
villain. The object of the game
for the villain is to get as big
a sentence as possible. To do
this, the villain must avoid
capture and knock down poor old
ladies. The object of the game
for the cop is, of course, to
stop the villain."
9610 LET A$=A$+"
The movement controls are -
                COP              ROBBER
    Left      Right      Left      Right
      1          2         9         0
      q          w         o         p
      a          s         l       ENTER
CAPS SHIFT       z     SYM SPT     SPACE
In addition, the cop can press
any of the following keys to set
up a road block -
1,2,q,a or x.
9620 LET A$=A$+"
                If the cop crashes or
runs down a pedestrian he will
be    suspended for ten goes whil
e he appears in court. Meanwhile
, theRobber is running free.....
                If the robber crashes
, he will be caught by foot patr
ols."
9630 POKE 23692,255: FOR I=1 TO
LEN A$: PRINT A$(I);: IF A$(I)="
" THEN BEEP .01,50
9640 NEXT I
9700 PRINT #1,AT 1,6; BRIGHT 1;
FLASH 1;"PRESS ANY KEY TO BEGIN"
: PAUSE 0
9710 FOR I=58 TO 0 STEP -8: POKE
 60000,I: RANDOMIZE USR 60000: P
OR J=1+10 TO I-10 STEP -8: BEEP
.01,J: NEXT J: NEXT I
9715 LET SUS=10: LET BIDD=0: LET
DROP=0: LET BLOCKS=8: LET BX=100
: LET BY=100: LET PCX=0: LET PCY
=0: LET PCD=2: LET A$="": LET R
CX=31: LET RCD=4: LET YEARS=1
9720 PAPER 0: BORDER 0: INK 6: C
LS: PRINT AT 0,0;
```



```
9730 PRINT
```



```
9740 PRINT
```



```
9750 PRINT INK 7;AT 0,0;"@"; INK
 2;AT 19,31;"@"
9760 RETURN
```

GRAPHICS -

A=■ B=■ C=■ D=■ E=▯ F=■

G=■ H=■ I=□ J=■ K=■

PLEASE NOTE THE FOLLOWING -

230 IF Y<BY AND X=BX THEN LET YEARS=YEARS+1 : GO TO 250

240 IF CODE SCREEN$ (Y,X)=32 THEN GO TO 600

PLEASE ADD THE FOLLOWING TO THE END OF LINE 260 -: -
  PRINT AT BY,BX;

CHANGE ALL RANDOMIZE USR TO LET Z=USR

TO INCREASE THE FREQUENCY OF THE PEDESTRIANS,DECREASE THE .7 IN LINE 275.

Forces of good and evil

***David Kelly** talks to Roy Carnell and Stuart Galloway of Carnell Software*

"As you see, we have a good view of the woods," grins Stuart, gesturing from the offices of Carnell Software towards the window and the timber yard next door.

Woods, forests, trolls, goblins and elves. Enchanted valleys, the forces of good and evil. All of these formed part of the world of Stuart Galloway and Roy Carnell long before they formed Carnell Software and wrote adventure programs.

Both grew up in Kirkcaldy, Scotland, and from an early age both were fascinated by any flights of the imagination they could lay their hands on. "Roy is a nutter on fantasy — quite an authority in fact, whereas I am more of a science-fiction fan," explains Stuart. They avidly collected shelf-upon-shelf of fantasy fanzines — *Famous Monsters of Film Land* and the like — and devoured the 40s Hollywood B movies they could find. They even designed their own board games.

At 13 they made their first film in 8mm — *The Mummy's Revenge*, with Roy swathed in bandages.

From then on, both set out for a career in film production. Undaunted by a teacher who informed them that people from Scotland didn't get jobs in the movies, both managed to get into Birmingham Film School.

While at Birmingham they met a man called Wally Vevvers who had created most of the special effects on Kubrick's film *2001*. He offered them a job and, almost before they knew it, they were thrown in at the deep end working in the team creating the special optical trickery for *Superman 1*.

After that they worked on a number of films. Probably the closest to their hearts, and the one on which they worked most on their own, was Boorman's *Excalibur*, set in the mythical days of Merlin and the Arthurian legends.

Fantasy on film, but not exclusively. Any form of escapism fascinated Roy. Ever since the advent of the micro he had wanted one — he could see it had possibilities. Like so many, he was only able to afford one when the ZX81 came out — and that is really when Carnell Software started, back in November 1981.

"I started programming, but it took a while for the first adventure to come," says Roy. "I started to write *Volcanic Dungeon* experimenting with program routines and on bits of paper while I waited for my 16K Ram pack to turn up."

Roy had plenty of time to program because of the way the British film industry works — or rather, doesn't. People like Roy and Stuart at that time were only working about three or four months a year. So Carnell really sprang out of a need to find something to do to fill up the spaces. "I took the computer over to Stuart," explains Roy, "with the idea of selling programs by mail-order and he fell about with hysterics because I couldn't get the program I had written to load!"

"I suppose we are frustrated story writers," says Stuart. "And a computer game is just like being able to take a role in one of our stories."

"We had never played an adventure or seen one until we wrote *Volcanic Dungeon*," says Roy. "That's why it is quite unlike anything else.

"It is more of a game — with lots of treasures and monsters scattered around a dungeon." In the adventure you must rescue a princess who has been captured by the wicked Magra. "You have to discover what weapons to use against which monster — just like a game of cards, when you go in to fight the Magra you have to have a good hand of weapons," says Roy.

"It is an adventure you can play again and again — it is always different," explains Stuart. "We've even got one guy who has made a peg-board to plot the treasures and monsters for each game. Another chap wrote to us after playing it for three months without finding the princess.

"That is why we decided to hold the Volcanic Dungeon Championships earlier this year — the winner took 53 minutes.

"You have got to know your mythology — or to have seen a few Sinbad films. Most people when they start out get killed in the first couple of caverns until they get more experienced."

In April last year rumours were rife that Sinclair would announce a new computer. Stuart and Roy reckoned it would be a 32K colour machine with the same Basic as the ZX81 so they started writing a new game accordingly — which became *Black Crystal*.

Roy was back in Scotland because they were both unemployed again. Stuart went to Earls Court when the Spectrum was announced: "I fought tooth and nail for one of those leaflets to find out the details — and we were very lucky — it was just what we had hoped."

Work on *Black Crystal* pressed on. "If we are ever stuck for inspiration we take a walk to the pub instead of the car. We

Roy Carnell (left) and Stuart Galloway — preparing for Magra.

wanted a multi-program game with graphics with a central map with locations on it which acted as the entry points to other programs.

"The problem with most adventures is plot — they don't have one. From being ■ films and being long-frustrated story writers we realised that the most important thing was that the game should have a purpose. An adventure should be like a novel. It took many walks to the pub and our phone bills went through the roof — you always seem to get inspiration late at night — but we decided to create our own entire world of mythology."

All of Carnell's games centre around the Third Continent — ■ long time in the past when the land masses of Europe, Africa and America were one. At the moment they are concentrating on the European part — the Black Mountains, its foothills and The Enchanted Valley.

In *Black Crystal* you must find the seven Rings of Creation and use them to destroy the forces of evil. When correctly positioned around the source of evil — the Black Crystal — it can be destroyed.

By the time the Spectrum arrived, Roy had written most of *Black Crystal*. Then things began to get hectic. They both began work at Shepperton studios on a new film — yet to be released — called *The Keep*. At the same time money began to get tight. "Everybody goes on about how good it is — but that's rubbish," says Stuart. "You have good times and bad times just like any other industry — and last summer was very difficult. Following the Spectrum's launch there was a lot of uncertainty.

"Roy's account went badly into the red — that's one of the reasons *Black Crystal* was delayed until November.

"That is when we formed Carnell Software more formally.

"We are much older and wiser now," says Roy, "but for a while we couldn't cope. We were trying to do two jobs at once — Carnell and the film — and demand for *Black Crystal* was much greater than we imagined it would be."

"We were doing the packing ourselves," explained Stuart. "I had to go sick at one point to get a day off work to send out the first batch of 870 *Black Crystals*."

Christmas was sheer panic. They thought it would slow down and it didn't. At Christmas they held packing parties with friends coming down for ■ Chinese, some beer and some packing!

At the start of this year the pair made the break, quitting *The Keep* for full-time work on Carnell.

"We are treading very carefully, and for that we may have lost ground compared with some of our competitors. But I think we will be one of the survivors," says Stuart, "rather than one of the balloons that goes pop in a very spectacular way."

He reckons that to complete Carnell's plans for Christmas this year will cost the company over £120,000.

Most important of the new titles is the sequel to *Volcanic Dungeon* and *Black Crystal* — *The Wrath of Magra*, available in November, at first for the Spectrum. Again it is set in the mythical Third Continent. Chronologically, it takes place at the same time as the *Black Crystal* was destroyed and the great battle was fought when the armies of evil and the Tree of Life were destroyed.

That was at the end of the Third Age when the balance of the forces of good and evil was restored.

So, the Fourth Age begins, as does the plot of *The Wrath of Magra*. You play the role of the hero from *Volcanic Dungeon*. The Snow Giants take the body of Magra back to her castle in the Black Mountains where she is brought back to life by the powers of black magic. She ■ furious with you and recaptures the princess, imprisoning her ■ the castle. "You have to rescue her and kill Magra — and Magra is just hoping you'll try to fight her on her own ground," says Stuart.

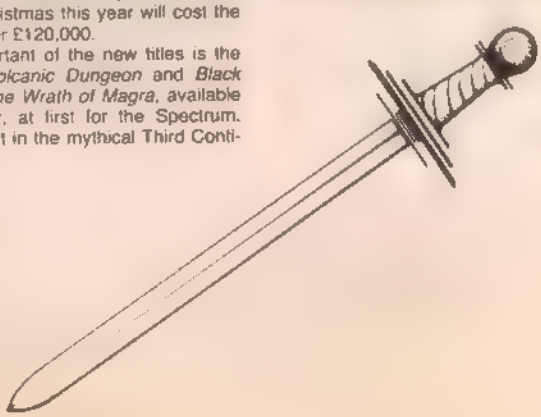
It will be a three-part adventure which will come complete with a 200-page paperback book detailing the history of the Third Continent and all of the spells needed for the game. "To use a spell it will be necessary ■ assemble the appropriate ingredients," explains Roy. "For example, to make a Saintly Staff you need to call up a dead saint — and you will need a lot of spiritual power to control it." Among the ingredients you might need ■ graveyard dust — and you would have to find that before making your Saintly Staff.

"We wanted to have an adventure where you can go to bed ■ night and take the book with you. What you will have ■ a real spellbook which you will have to learn to use — it is like you are a novice wizard thrown ■ at the deep end. You will have to go away and learn how to cope," says Roy.

"We don't see why you should get away with just pressing buttons."

During the three stages of *The Wrath of Magra* you must progress under the Black Mountains, up through the Mines and into Magra's castle.

And when you get there, you will have to be very well prepared, warns Roy. ■



YEP FOLKS — IT'S HERE

AVAILABLE NOW
Spectrum 48K
Dragon
Com. 64

CALIFORNIA

GOLD RUSH

HOWDE DO PARDNERS
This here's Prospector Jake, I sure am havin' one helluva time tryin' to peg ma claim with those damned Injuns a hootin' an a hollerin' all over this territory. Ma job gets harder as I move from one Gold Field to another. I know, that is me an' ma stubborn hornery ol' Mule here know of 24 rich an' I mean rich seams of pure Gold. All it needs to make this here ol' critter happy is that you help me peg every doggone last one of them claims.

Can YOU help Jake become rich, help him peg his claim, dodge the arrows, avoid the tomahawks, and plant the Dynamite in just the right place? . . . YOU CAN!!!

YIPPEE . . . Git yer Picks an' Shovels and join the CALIFORNIA GOLD RUSH . . . NOW

Amazing Arcade Action . . . Stunning Sound and Graphics
Available NOW for Commodore 64, Spectrum 48, and Dragon

£7.95 including P&P

SPECIAL OFFER ***SPECIAL OFFER*** ***SPECIAL OFFER***

Order CALIFORNIA GOLD RUSH before August 14 and get a 10-game Cassette of terrific games . . . **FREE**

COMING SOON

LEAPIN' LANCELOT: Medieval Machine Magic to enthral you
GALACTIC SURVIVAL PAK: Every Astro-Traveller *must* have this!

ANIK

We always need Dynamic Dealers and Imaginative Writers

Please rush me CGR for (m c)

TOTAL SUM INCLUDED £
Please make cheques and POs payable to ANIK MICROSYSTEMS
30 KINGSCROFT COURT
BELLINGE NORTHAMPTON

Name.....
Address.....
.....
.....

- Britain's No 1 range of products
- Check our UK dealer network for your nearest outlet
- After sales, speedy service from our own factory and engineers

It's our aim to provide satisfaction at the sign of the Big 'M'. By providing local distributors, best prices and service, we offer you the most. If you don't see it in our ad., ask your local distributor, or write to our Head Office for full list. *All prices include VAT.* All products normally in stock but to prevent a wasted journey phone your local dealer first before calling.

BBC ORIC ATARI COMMODORE
JUPITER COLOURGENIE SINCLAIR
DRAGON LYNX MICROPROFESSOR

AGENTS

Head Office: 16 Princes St, Ipswich 0473 219461

Abergele
Abergele Computer Centre
8 Water St 0745 826234

Ballymoney
Everyman Computers
Charlotte St 02656 62116

Birmingham
The Software Centre
80 Hurst St B5 021 622 2696

Bodmin
Microtest Ltd
18 Normandy Way 0208 3171

Bridgend
Automation Services
31 Wernlys Rd, Penyfai 0656 720959

Bristol
The Model Shop
65 Fairfax St 0272 23744

Bromley
Datastore
6 Chatterton Rd. 01 460 8991

Cambridge
GCC (Cambridge) Ltd
66 High St, Sawston 0223 835330

Chelmsford
Essex Computer Centre
Moulsham St. 0245 356702

Clacton-on-Sea
Clacton Computer Centre
Pier Avenue 0255 422644

Colchester
Emprise Ltd
58 East St 0206 865926

Coventry
Coventry Micro Centre
33 Far Gosford St 0203 58942

Gloucester
The Model Shop
79 Northgate St 0452 410693

Great Yarmouth
Criterion Computers
12 George St 0493 53956

Guildford
The Model Shop
23 Swan Lane 0483 39115

Hastings
The Computer Centre
32 Robertson St 0424 439190

Hay-on-Wye
The Playpen
Market St 0497 820129

Hemel Hempstead
Fasmasters
25 Market Square 0442 59044

Holyhead
P & K Computers
33 Williams St 0407 50283

Hull
Computer Centre (Humberside)
26 Anlaby Rd 0482 26747

Ilfracombe
Bits & Bytes
64 Fore St 0271 62801

Ipswich
Micro Management
32 Princes St 0473 59181

Kingston-on-Thames
Visor Store
3 Eden Walk 01 546 4900

Lichfield
Fosters
59 Tamworth St 05432 22341

Liverpool
Beaver Radio
20-22 Whitechapel 051 709 6898

London
Computers of Wigmore St
87 Wigmore St W1 01 486 0373

Percivals
83 High St North East Ham, E6
01 472 8941

Trend Video & Hi Fi
162 High St, E17 01 521 6146

Northampton
Richard Reeves
174 Kettering Rd 0604 33578

Plymouth
TTB Lawson
71 New George St 0752 665363

The Model Shop
11 Old Town St 0752 21851

Shetland
Tomorrows World
Esplanade, Shetland 0595 3145

Southend-on-Sea
Estuary Software
261 Victoria Ave 0702 43568

Stevenage
Video City
65-67 Fisher Green Rd 63809

Stroud
The Model Shop
22 High St 04536 5920

Surbiton
Computasolve
6 Central Parade, St Marks Hill
01 390 5135

Taunton
I.A Gray
1 St James St 0823 72986

West Bromwich
Bell & Jones
39 Queens Square, Sandwell Centre
021 553 0820

A taste of the Orient

***David Aubrey Jones** presents an in-depth review of the Laser 200*

When the Laser 200 was launched at the Earls Court computer show in London last month, it generated considerable interest. In spite of Sinclair's recent price cuts, the Laser reduced the price of a micro offering both colour and sound by a full £30. So just how well does it compare with its more expensive rivals? Is it rubbish from the Far East or is it a serious contender for your money?

Manufactured by the Hong Kong company Video Technology for £69.95, the Laser 200 computer comes complete with power supply, all leads, three manuals and a cassette containing eight interactive programs (games and more serious applications/Basic and machine code). The Laser has a tough, cream coloured, plastic case with separate rubber keys as per Spectrum. However, these are harder and have a more positive feel than those of their competitor. They auto-repeat and there is a useful 'click' sound when they are pressed, but I noticed an occasional tendency for them to bounce.

On the top right is a grille to help dissipate the heat generated inside the case — there was no sign of any overheating even in the hot weather. A power-on light glows in the top right-hand corner of the keyboard and there is a well-positioned on-off switch on the side (Sinclair take note). At the rear are connections for TV, monitor, cassette and power, together with two expansion ports. One of these is for extra Ram and the other for some peripherals such as joysticks (£19.95 pair) and printer (Centronics interface £19.95; four-colour printer £149.95).

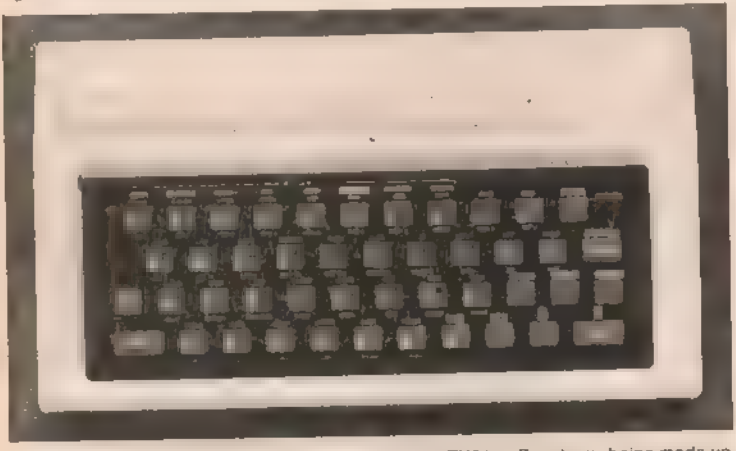
Four K of Ram is built in, leaving less than 2K available for programs. However, due to the fact that keywords are stored in ■ tokenised form, some programs are possible within it.

When the Laser arrives in the shops, memory will be expandable to 20K for £29.95 with ■ plug-in unit. In spite of considerable use, there was no trace of the dreaded "Ram pack wobble". Later in the year, ■ 64K Ram pack (£59.95) will also be available.

At the heart of the Laser is a Z80A running at 3.58MHz, the same speed as that of the Spectrum. The Laser also supports double precision variables for increased accuracy in calculations, an unusual feature in a low-priced home micro, and integer variables. ■ integer variables are used in a program instead of real variables, a speed increase of some 20-30 percent can be obtained, which would be very useful for games programs.

When the Laser is first switched on, text is displayed in light green on a dark green background with a black border. This was clear and easy to read. The background colour can also be changed to dark orange, and inverse characters can be printed. The chip that handles the display is the same as that used in the Acorn Atom and Dragon computers. This allows nine colours on the screen at ■ time in text mode (32 columns ■ 16 lines) in the form of "Battenburg" graphics characters.

These are similar to those found on the Sinclair ZX81 or Spectrum, being made up effectively of 2 × 2 pixels. They are displayed ■ one of eight colours on a black background and allow a resolution of 64 × 32. The colours are green, yellow, blue, red, buff, cyan, magenta and orange.



A higher resolution mode (128 × 64) is also available. The resolution of this is not as high as that of the Spectrum, but the colour resolution is actually higher; each pixel or point can be set to a different colour (unlike the Spectrum there are no restrictions in the form of only two colours per character area in this mode).

Eight different colours can be used in high resolution, four at any one time. The two sets that one can choose between are green, yellow, blue and red, or buff, cyan, magenta and orange. The colours were steady and fairly sharp on all three colour televisions the Laser was tested with.

The Laser uses a form of Microsoft Basic, contained in a 16K Rom. All the standard commands and functions are available, including the facility of multi-statement lines. Strings are supported together with *Len, Str$, Val, Left$, Right$, Mid$, Asc, Chr$* and *Inkey$*. Arrays, both numeric and string, can be of any length and have up to three dimensions. There is also no restriction on the length of variable names, although only the first two characters are recognised.

An interesting and unusual feature of the Basic are some very powerful *Print* commands. As well as the usual *Print@* and *Print Tab, Print Using* allows the formating of output in a similar way to the language Cobol which is often used for business applications. For example:

PRINT USING "####";A where A = 2.36428 will produce ₹2.36

There are seven field specifiers that *Using* will support to allow the printing of output to your exact requirements. Structured programmers will also be pleased with the inclusion of an *If . . . Then . . . Else* statement.

The high resolution graphics commands are less extensive than on some micros; there are no *Draw* or *Circle* commands. It is left to the software houses to fill this gap. *Set (x,y)* plots a dot at a specified location on the screen (where *x* is ■ value from 0 to 12, and *y* a value from 0 to 63) and *Reset (x,y)* blanks it out. *Point (x,y)* tests a point to see if it has been set — useful to see if your missile has hit a space invader!

The *Color* command changes the current ink and paper colours (note American spelling). ■ takes the form *Color F,B* where *F* ■ a number between 1 and 8, the foreground or ink colour you wish to use, and *B* is either ■ or 1, the background or paper colour you require. Some interesting effects can be obtained in the higher resolution mode by switching between background colours, since this also changes all four colours currently in use. It is somewhat dramatic to watch your picture made up of the colours green, yellow,

blue and red instantaneously change into buff, cyan, magenta and orange! In contrast, changing the paper colour in the low resolution mode has no effect on the ink colour.

Mention has already been made of sound. This is produced and controlled by the microprocessor in a similar way to that of the Spectrum. Even speech is possible using machine code, by switching the port that controls the speaker directly, but from Basic you are limited to the *Sound* command. This is similar, but slightly less versatile, to *Beep* on the Spectrum. Two arguments following *Sound* control the pitch in semitones, and the length of the note.

SOUND pitch, length

where pitch is a number from 0 to 31, and length is a number from 1 to 9. The manual provides a table that details the notes on the musical scale and their equivalent pitch values. Thus:

```
For N= 1 to 5
READ P,L: SOUND P,L
NEXT
DATA 29,4,31,4,27,4,15,4,22,6
```

will play a tune that will be well known to BBC computer owners (Close Encounters . . . !).

A fierce controversy has waged over the pros and cons of the single key entry of keywords. In this the Laser should please everybody. If you like it, it is there, and, if you don't, you can type all command words in full. In practice, I found this very useful. I ended up using a combination of the two methods — single key entry of the most commonly used words and letter entry of the others. This feature should prove very helpful to beginners.

Another strong feature of the Laser is editing, which is often difficult or lacking on the lower priced micros. Full on-screen editing is supported. After listing the section of the program you wish to alter, you shoot to the exact point using the cursor keys. Extra space can then be added in a line using *Insert*, words can be deleted using *Rubout*, and corrections can be made.

When the line has been altered to your requirements you just press *Return* and it will be stored in its new form. One thing that did take a bit of getting used to, however, is the fact that *Rubout* works in the opposite direction to the delete key on most computers — it deletes characters to the right and not to the left. Annoying.

Loading and *Saving* to cassette tape takes place at 600 baud, twice the speed of the ZX81, but considerably slower than the top rate of many of the other newer micros. The cassette interface was fairly reliable, but difficulties were experienced with one out of five recorders tested. It proved very difficult to *Load* programs with this recorder when they had been *Saved* on one of the other recorders.

A useful loading sign appears at the bottom left of the screen giving information on the program found, etc, and a *Verify* command is included. Data files are also supported using *Print#* and *Input#* where the values of the specified variables or data are saved on to cassette tape.

A review of the Laser would be incomplete without some mention of the documentation that comes with the machine. Two small booklets are provided, and a manual on Basic. The first booklet, the 'user manual', provides brief details on setting up the Laser, while the other contains a collection of 21 *Basic Application Programs*. A nice idea, but most are uninspired with titles such as *Gallon and Litre*, *Word Guessing* and *Sorting Words*. The Basic manual assumes no computer knowledge and starts with 'What is a computer?'. A lot could have been done to make it more friendly and the manufacturers say they are making changes to it.

In conclusion, the Laser 200 offers reasonable value for money. It is suited to the first-time user who initially requires a basic machine that can be expanded at a later date. Its main deficiency is the fact that characters cannot be redefined, as on the Dragon. However, by using the higher resolution mode, this can largely be circumvented and quite reasonable character shapes can be drawn and used in machine code games, etc.

Ultimately, the success of a home micro depends to a large extent on the ready availability of good cheap cassette software. ■

LASER 200 FEATURES

CPU: Z80A running at 3.58 MHz
MEMORY: 16K Rom with Microsoft Basic Interpreter
4K Ram expandable to 64K
DISPLAY: Text — 32 × 16
Graphics Mode (0) — 64 × 32 (9 colours)
Graphics Mode (1) — 128 × 64 (8 colours; 4 at any one time)
Colours — black, green, yellow, blue, red, buff, cyan, magenta and orange
SOUND: Single channel from speaker
CASSETTE: 600 Baud with any ordinary cassette recorder
EDITING: Full on-screen editing
KEYBOARD: Moving rubber with auto repeat and audible 'click' on all keys. Optional single key entry.

BASIC COMMANDS

STATEMENTS

CLOAD	END	LPRINT	PRINT#
CLEAR	FOR . . TO STEP	MODE	READ
CLS	GOSUB	NEW	REM
COLOR	GOTO	NEXT	RESET
CONT	IF THEN ELSE	OUT	RESTORE
COPY	INPUT	POKE	RETURN
CRUN	INPUT#	PRINT	RUN
CSAVE	LET	PRINT@	SET
DATA	LIST	PRINT TAB	SOUND
DIM	LLIST	PRINT USING	STOP
			VERIFY

FUNCTIONS

ABS	INKEY$	NOT	SIN
AND	INP	OR	SQR
ASC	INT	PEEK	STR$
ATN	LEFT$	POINT	TAN
CHR$	LEN	RIGHT$	USR
COS	LOG	RND	VAL
EXP	MID$	SGN	

QUICK, SMART AND EFFICIENT

PRODUCTS FOR THE SPECTRUM, VIC-20, ZX81

FOX SPECTRUM
48K UPGRADE KIT
(ISSUE 2 MACHINES ONLY)

A high quality kit at a new LOW, LOW PRICE, which simply plugs into existing sockets within your Spectrum. No soldering is required and step by step instructions are supplied.

PROBABLY THE BEST KIT AVAILABLE AT DEFINITELY THE LOWEST PRICE.

£20.99

Should you require any more information on the [illegible] (or any other items). Please phone or write to us at the address below.

Give your VIC-20 a new DIMENSION

Vixen RAM cartridge £34.95

Switchable between 16k or 8k+3k.

Gives you the option of full 16K or 8K and 3K RAM in one package. When added to a standard VIC-20 gives 16384 bytes of extra memory in memory blocks 1 and 2 or 3092 bytes of extra memory into the 3k memory block and 8192 bytes of extra memory switchable between memory blocks 1 and 3.

- Fully compatible with available motherboards modules
- Simply plugs into the rear expansion port of computer.
- No re-addressing of existing BASIC programs needed.

From Fox the new FDS for the SPECTRUM, ZX81, JUPITER ACE, and the ORIC as illustrated.

This elegant desk top system, designed for the professional user. [illegible] its slimline case, the superior keyboard contains [illegible] the graphic characters for the above computers. With the additional function keys and SPACE-BAR, speedy and accurate data entry is made simple. The Fuller FDS is easy to install, based on the very popular FD42 system, it requires no soldering or technical knowledge. For the user who is reluctant to install his computer circuit board inside the FDS a buffer is available (at extra cost) which simply plugs onto the expansion port and connects directly to the keyboard

£39.95 incl.

HARDWARE ZX81

PANDA

The famous Panda Expandable Ram Pack. Massive 16K add-on memory which can easily be expanded to 32K with an optional plug-in module. Supplied in no-wobble design, rugged, injection moulded case, contoured to fit the ZX81 snugly. Comparable with other add-ons (printer etc.) LED on/off indicator. No additional power needed just plug in and go. British designed and made from top quality components throughout, guaranteed 12 months.

16K ONLY £19.95
32K ONLY £34.00

SEND NOW TO

FOX ELECTRONICS

141 ABBEY ROAD, BASINGSTOKE, HANTS. TEL: 0256 20671

CALLERS WELCOME

Please send me:-

SPECTRUM UPGRADE ☐
VIXEN CARTRIDGE ☐
ZX-PANDA 16K /32K RAM PACK ☐
FDS KEYBOARD ☐

Name .....

Address .....

..... Post Code .....

24HR CREDIT CARD SALES BARCLAYCARD NO.

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

OVERSEAS CUSTOMERS PLEASE ADD £3.50 p+p.

Musical inspiration

***Peter Bartley** examines the musical abilities of the Vic20 in the fifth of a six-part series*

You've all heard random music on the Vic. Not very inspiring, is it? (Don't know what ■ this "Ludwig" business in the book is about . . .) Try Figure 1 for somewhat improved music.

Well, it's a start, anyway. The data read in lines 30, 40 and 60 produces a continuous bassline, over which are played random notes (line 50) defined in line 10. The notes are defined so that they sound OK whatever stage the bass is up to. This is a very powerful method of ensuring that the music is always tuneful (if a little bland). The only hard part about it is figuring out the bass — I've heard a couple of good rock 'n' roll lines and it should be easy to think up some others.

Probably the reason there is a very little tuneful Vic music about is that it takes so much time and effort to produce. Yet surprisingly musical effects are fairly easy to simulate. Figure 2 is a rather neat little "syndrums" program. Play them using keys 1-8, and try hitting the same key very quickly a few times.

Still on the subject of musical effects, Figure 3 is a demonstration "drumbeat" program — a little simple, but it gives the general idea.

Note that the sound registers are *Poked* off as soon as they are turned on (line 30). Any delay between this sounds the "drumbeat" as a note. One way to modify this program is to have the information concerning the drumbeats and delays in Data statements, which would mean they could more easily be changed (at will, in fact). Get weaving.

Finally, a word about envelope shaping. When a note is played from the Vic, it continues to play until you *Poke* the register with zero. On the other hand, a note from a piano decreases ■ volume (after peaking). Obviously to make the Vic sound like a piano, we must make the volume decay accordingly (define the volume envelope). Try:

```
10 POKE 36874,225:POKE 36875,243:POKE
   36876,225
20 FOR A = 1 TO 5 STEP 1 POKE 36878,A:NEXT
30 FOR A = 15 TO 0 STEP-.05:POKE 36878,A NEXT
```

Musical tunes are useful in games to "introduce" the players or as "rewards" for high scores.

You may have noticed that in the first program the full three voices were used. Although they enhance the sound, producing three voice harmonies on the Vic is very, very difficult and boring. Each note and pause must be written into data statements. Yet the results can be stunning. As an example, try:

```
10 POKE 36878,15
20 READ A,B,C,D:IF A<>0 THEN POKE 36879,A
30 POKE 36876,A:POKE 36875,B:POKE 36874,C:
40 FOR E=1 TO D:NEXT:IF D=1 THEN END
50 GOTO 20
60 DATA 225, 215, 195, 720, 0, 215, 195, 0, 225,
   235, 195, 720, 0, 235, 195, 0, 225, 225, 195, 480
70 DATA 228, 228, 215, 240
80 DATA 231, 225, 225, 720, 0, 225, 225, 0, 231,
   225, 225, 480, 228, 228, 215, 240, 231, 225, 225,
   480
90 DATA 233, 211, 211, 240
100 DATA 235, 215, 231, 1450, 240, 240, 225, 720,
   235, 215, 231, 720, 231, 225, 225, 720, 225, 215,
   195, 720
110 DATA 235, 215, 231, 480, 232, 163, 163, 240,
   231, 207, 207, 480, 228, 215, 215, 240, 225, 225,
   225, 960
120 DATA 0, 0, 0, 1
```

Yes, it's that old chestnut . . . Well, what did you expect — Mozart? Hmmm, now there's a thought!

There are a couple of methods to allow music to be played directly from the keyboard of the Vic. Page 75 of the Vic20 users manual is one example, with the musical note values being stored ■ an array. The Vic1211A super expander cartridge allows you to do the same by putting the machine into "music mode". This also allows music to be played from within a *Print* statement. The powerful *Sound* command makes the production of harmonies a much more pleasant prospect. As well as this, the cartridge offers high-resolution graphics with commands like *Paint*, *Point*, *Draw*, *Circle* and *Color*, and an extra 3K of memory. Various *Read* commands for joysticks, lightpens and paddles are also available. ■

STOP PRESS: Think you couldn't get high-resolution graphics on your Vic without buying a cartridge? Wrong. Type in this program (carefully) then sit back and watch. Be warned, though, it takes a fairly long time.

```
10 POKE 36879,8:POKE 36867,24:POKE
   36866,16 OR 128 POKE 36865,46
20 POKE 36864,18:POKE 36869,240 OR
   13:POKE 56,33
30 FOR A=0 TO 255:POKE 7680+A,A:POKE
   38400+A,5:NEXT: FOR A=5120 TO
   7168:POKE A,0:NEXT
40 FOR H=5 TO 1 STEP-1:FOR A=0 TO 13
   STEP .03:B=COS(A)*25+64
   C=SIN(A)*9+H+50
50 B%=B/8: C%=C/8 D=B% + C%*16 +
   7680:E=PEEK(D)
60 F=5120+E*8+(C AND 7):POKE F,PEEK
   (F) OR (2↑(7-(B AND 7)))
70 NEXT A,H:POKE 36878,15:POKE 36876,230
```

Figure 1

```
10 C(0) = 207:C(1) = 215:C(2) = 231:C(3) =
   225:POKE 36878,15
20 FOR D = 1 TO 4
30 READ A:POKE 36874,A
40 READ B:POKE 36875,B
50 POKE 36876,C(INT(RND(1)*4))
60 READ C:FOR S = 1 TO C:NEXT
70 NEXT D:RESTORE:GOTO 20
80 DATA 195,207,250,207,0,120,209,0,
   300,207,195,120
```

Figure 2

```
10 POKE 36878,15:PRINT"[CLR]****
   SYNDRUMS (PMB)****"
20 FOR F = 1 TO 8:READ A(F):NEXT
30 DATA 201,212,223,235,239,240,
   245,250
40 GET A$:IF A$<>"" THEN V = 10:
   N = VAL(A$):P = A(N):GOTO 60
50 IF P>0 THEN V= 1
60 P = P - V
70 IF P< = 170 THEN P = 0: V = 0
80 POKE 36876,P
90 GOTO 40
```

Figure 3

```
10 POKE 36878,15
20 FOR A = 1 TO 500:NEXT
30 FOR A = 1 TO 3:POKE 36877,200:
   POKE 36874,200:POKE 36877,0:
   POKE 36874,0
40 FOR B = 1 TO 20:NEXT B,A
50 FOR A = 1 TO 500:NEXT
60 POKE 36877,240:POKE 36874,240:
   POKE 36877,0:POKE 36874,0:
   GOTO 20
```

The odd best-seller

***Dale McLoughlin** presents a simple word processor for the 48K Spectrum*

The Sinclair Spectrum does not readily lend itself to word processing applications, due really to the quality of its keyboard. However, it would still be useful to have a simple word processing program among one's software repertoire; it may help you to write the odd best-seller, or an article for your favourite computer magazine.

Here then is just such a program. It is written almost entirely in machine code, nearly 800 bytes in all, but do not be put off by the daunting task of entering all that hex — it will be well worth it when all is done. Of course, in less than 1K it is not possible to include all the user friendliness and versatility of a professional package, but the program is quite easy to use and much faster than anything written in Basic could ever be.

To enter the machine code, first type in program 1. When you run this, it will allow you to enter the hex in convenient blocks of any length, eg *0E* or *0E2A4B* etc. Program 1 *Pokes* the code into the top of memory, above Ramtop, which it moves for you, and overwriting the user defined graphics. You should *Save* the machine code immediately, to avoid any problems in case mistakes have been made. Use the command *Save "Wordproc" Code 64750,785*.

If you later find that there is an error (usually found by the system crashing), enter program 2 and run it to cross-check against the hex listing. When you find your mistake (or mistakes), make a note of the address and manually enter the correct data, remembering to convert the hex to decimal (appendix A of the Sinclair manual will help you do that). Since program 1 checks the total number of bytes entered, it should not be possible to leave something out without noticing. Note also that the first eight bytes are used to store variables and may be changed during the running of the *Wordproc* program.

Program 3 is the Basic part of the actual word processor. This should be entered, saved with *Save "Wordproc" Line 1* and then have the machine code bytes saved again immediately after it.

The machine code itself is divided into two main parts. There is an *Input* routine that uses the computer's own keyboard scanning program, which is called 50 times every second. The *Usr* routine simply looks to see which key was pressed last, if any, and then enters it into the appropriate position in the text. It recognises most of the single character symbols, ie *A-Z, 0-9* and all the symbols obtained by the caps or symbol shift keys. You cannot, however, get into extended or graphics modes, but this should not be any great disadvantage.

The other main machine code routine prints the text, or an appropriate part of it, on to the screen. The text is held in a single dimension array (*T$*) which must be the first variable in the variables area of memory, (hence the *Clear* statements in program 3). *T$* can be of any length, but in practice the maximum is about 40,000 characters. This corresponds to roughly 6,500 words of normal English, perhaps 20 pages of a paperback book.

The position of the cursor is shown in *T$* as a *Chr$0* and the end of text as *Chr$1*. These characters are not used in the Spectrum set so, if you *Print T$* as a Basic command after using the *Wordproc* program, they would show only as question marks. In fact, the whole of the array would look rather strange, because each line beginning throughout the text is shown as a character with 128 added to its usual code, thus a space becomes a graphics "*Q*".

On the display screen the cursor is shown by a flashing magenta square. The next character to be typed will appear in the position currently occupied by the cursor. The cursor can be moved within the text and new text can be added into any position. In any case, once more than 14 lines of text have been entered, the computer attempts to keep the cursor on line 15 of the screen, or thereabouts. When you have the program working, experiment with moving the cursor around and entering text, you will soon get the hang of it.

As I have already mentioned, all of the alpha-numerics and most of the other symbols can be accessed by the program. Unfortunately the capital shift lock does not work but this should not be a serious drawback. Other key functions are (all with caps shift except enter):

ENTER — moves cursor down to start a new line. When pressed in the middle of some text the next character pressed will move that line down to the next

5 & 8 — cursor movement left and right, one space at a time throughout the whole text

PROGRAM 1

```
10  DEF FN H$ (X) = CHR$ (48 + (( INT (X/16)) + (7 AND INT (X/16) > 9)) +
    CHR$ (48 + (X - INT (X/16) * 16 ) + (7 AND X - INT (X/16) * 16 > 9))
20  FOR X = 64750 TO 65532 STEP 5 : PRINT X ; " " ;
30  FOR Y = X TO X + 4 : PRINT FN H$ ( PEEK Y ) ; " " ; : NEXT Y
40  PRINT " " : NEXT X : STOP
```

PROGRAM 2

```
10  DEF FN H (X$) = 16 * (( CODE X$ ( 1 ) - (48 AND X$ ( 1 ) < "A" ) -
    ( 55 AND X$ ( 1 ) > "9" )) + ( CODE X$ (2 )) - (48 AND X$ ( 2 ) < "A" ) -
    ( 55 AND X$ ( 2 ) > "9 ")
20  CLEAR 64749 : LET X = 64750
30  INPUT X$ : IF X$ = ""THEN GO TO 30
35  IF X - INT ( X / 5 ) * 5 = 0 THEN PRINT " X ; " ";
40  PRINT X$ ( TO 2 ) ; " " ; : POKE X , FN H ( X$ ( TO 2 )) : LET X = X + 1
50  IF X > 65532 THEN PRINT " END OF DATA " : STOP
60  IF X$ = "" THEN GO TO 30
70  GO TO 35
```

PROGRAM 3

```
10  CLEAR 64749 : LOAD "" CODE
20  CLEAR : DIM T$ ( 40000 ) : RANDOMISE USR 64758
30  POKE 23560 , 255 : RANDOMISE USR 64895 : RANDOMISE USR 64767
40  PRINT AT 21 , 0 ; INK 1 ; " SAVE OR LOAD TEXT ? " ; PAUSE 0
45  IF INKEY$ <> "" THEN GO TO 45
50  PAUSE 0 : IF INKEY$ = "S " OR INKEY$ = "s " THEN INPUT " FILE NAME ? " ;
    LINE X$ : SAVE X$ DATA T$ ( ) : PRINT AT 21 , 0 ; INK 1 ; " TO VERIFY
    PRESS ANY KEY " : PAUSE 0 : VERIFY X$ DATA T$ ( )
60  IF INKEY$ = "L " OR INKEY$ = "l " THEN CLEAR : LOAD "" DATA T$ ( ) :
    RANDOMISE USR 65484 : GO TO 30
70  CLS : PRINT AT 21 , 0 ; INK 1 ; " CLEAR TEXT ARRAY ? " : PAUSE 0 : IF
    INKEY$ <> "N" AND INKEY$ <> "n" THEN GO TO 20
80  GO TO 30
```

6 & 7 — cursor up and down. The cursor is always left at the end of a line, if you want to move along a line use shifted 5 or 8 as above. If the line is full of characters (even if there are only spaces at the end) the cursor will appear at the start of the next line, but it will move sideways just the same with shifted 5 or 8.

9 — delete. Remember that it will delete the character immediately before the cursor. If the cursor is at the beginning of a line it will delete the last character of the line above and if it is at the second character of a line then that line may become part of the one above.

1 — breaks out of the machine code, and returns to BASIC, enabling you to Save or Load text or stop the program if necessary. When text is saved it is only the array T$ which is saved. In this way you could have a tape of text files with the main Wordproc program appearing only once at the beginning. Incidentally, because of the way the program uses memory it is not possible to check the file name when loading, so be sure to have the tape in the right place first of all.

2 — enables you to make a copy of the screen ■ the printer. It does this by calling a routine in the ROM at address 3756 which carries out the COPY command. If you wish to print out a whole file you will have to juggle the text around and successively copy the screens. Unfortunately the Sinclair printer is not suitable for serious word processing applications.

Incidentally, the *Break* key is disabled, except after pressing caps shifted one, and the usual repeat function still works. There is also a short click, to let you know that a key has been pressed.

When you are adding characters into the middle of some existing text, you will notice that the computer responds much more slowly. This is because everything else in *T$* must be moved up to make room for the new data and it is also necessary to completely reprint the whole screen after each key depression. It is all performed very fast, but the time difference is still noticeable. The same applies to delete.

The machine code stores a few bytes of information necessary for its operation in various places. The most noteworthy of these is in locations *23728/9*, which are unused bytes in the system variables area of memory. These contain the address of the cursor in memory (actually somewhere within T$), so *Print Peek (Peek 23728 + 256 * Peek 23729)* should always give *0*. When *T$* is *Loaded* from an existing file, a routine is called which finds the new location of the cursor and the other data which the program requires. The routine at *64758* is used when the program is first run, to set up those variables in the first place.

Finally, note that you can use any colours of *Ink* and *Paper* just by setting them with universal commands before running the program (or they could be added as, say, line 5). Only the cursor cannot be changed easily — I'm afraid you are stuck with the flashing magenta square. ■

Continued on page 23

WORDPROC HEX LISTING

Address	Hex				
64750	00	00	00	00	00
64755	00	00	00	2A	4B
64760	5C	01	06	00	09
64765	22	B0	5C	22	F4
64770	FC	22	F0	FC	36
64775	00	23	36	01	21
64780	■	5C	36	80	C3
64785	7F	FD	3A	08	5C
64790	3C	28	FA	3D	FE
64795	07	C8	CD	08	FE
64800	CD	86	FF	CD	A0
64805	FF	3A	B1	5C	FE
64810	80	CC	7F	FD	18
64815	E3	FE	B0	D0	D6
64820	20	F5	78	E6	18
64825	F6	40	67	78	E6
64830	07	0F	0F	0F	B1
64835	6F	EB	F1	3C	3D
64840	28	17	ED	4B	36
64845	5C	04	26	00	6F
64850	29	29	29	09	06
64855	07	14	23	7E	12
64860	14	23	10	FA	C9
64865	06	07	14	EB	36
64870	00	24	10	FB	C9
64875	26	00	6B	29	29
64880	29	29	29	11	00
64885	58	19	06	00	09
64890	77	22	F2	FC	C9
64895	3A	8D	5C	2A	F2
64900	FC	77	01	00	00
64905	2A	F4	FC	7E	FE
64910	01	28	61	FE	00
64915	20	23	3A	B1	5C
64920	FE	00	28	0C	3E
64925	00	B9	28	07	0E
64930	00	04	3E	16	B8
64935	C8	3E	■	E5	C5
64940	ED	43	EE	FC	CD
64945	6B	FD	C1	E1	23
64950	18	D4	FE	80	38
64955	1F	D6	80	08	3E
64960	00	B9	28	16	3E
64965	20	B9	28	0A	E5
64970	C5	CD	30	FD	C1
64975	E1	0C	18	F1	0E
64980	00	04	3E	16	B8
64985	C8	08	E5	C5	CD
64990	30	FD	C1	E1	23
64995	0C	3E	20	B9	20
65000	A3	0E	00	04	3E
65005	16	B8	20	98	C9
65010	3E	20	B9	28	08
65015	C5	CD	30	FD	C1
65020	0C	18	F3	0E	00
65025	04	3E	16	■	20
65030	EB	C9	21	08	5C
65035	7E	FE	FF	C8	36
65040	FF	F5	21	32	00
65045	11	00	00	CD	B5
65050	03	F1	FE	20	30
65055	06	CD	A8	FE	C3
65060	7F	FD	21	81	5C
65065	86	36	00	2A	4B
65070	5C	23	23	23	23
65075	5E	23	56	19	ED
65080	4B	■	5C	03	A7
65085	ED	42	C8	FE	■
65090	38	04	ED	43	F0
65095	FC	ED	43	B0	5C
65100	08	0A	FE	01	20
65105	35	08	60	69	2B
65110	77	23	36	00	23
65115	36	01	ED	4B	EE
65120	FC	C5	FE	B0	38
65125	02	D6	B0	CD	30
65130	FD	2A	F2	FC	3A
65135	8D	5C	77	23	36
65140	■	22	F2	FC	C1
65145	0C	3E	20	B9	20
65150	03	0E	00	04	ED
65155	43	EE	FC	C9	08
65160	2A	4B	5C	23	23
65165	23	23	5E	23	56
65170	19	36	01	2B	E5
65175	08	A7	ED	42	44
65180	4D	E1	54	5D	2B
65185	ED	B8	12	CD	7F
65190	FD	C9	FE	0D	20
65195	19	21	B1	5C	7E

At last...
A joystick that works!

The **intelligent** Joystick

Cambridge Computing bring you the first **programmable** joystick - at a price you can afford.

£29.90
JOYSTICK, INTERFACE AND TAPE COMPLETE

Interface

- 1k on board memory
- Own rear edge connector – for printers etc.,
- Compatible with all standard joysticks

Joystick

- Self centring
- 8 Directional microswitched action
- 2 independent fire buttons

Tape

- Easy to use program enables the interface to work on ALL software
- Keeps a record of all your games – so you only need to tell it about each game once!

CAMBRIDGE COMPUTING

1 Benson Street, Cambridge CB4 3QJ
Telephone 0223 322905

Please send me:-
Joystick, Interface and Tape at £29.90 ☐
Interface and Tape at £24.00 ☐
Joystick only at £7.00 ☐
For Spectrum
I enclose cheque / postal order* for £.....
made payable to Cambridge Computing Limited.
*delete as necessary.

```
65200 FE 80 20 0E 3E
65205 20 32 08 5C CD
65210 08 FE CD 7F FD
65215 21 81 5C 36 80
65220 C9 21 81 5C 36
65225 00 FE 0C CA 51
65230 FF FE 08 20 1A
65235 2A 4B 5C 01 06
65240 00 09 ED 4B B0
65245 5C A7 ED 42 C8
65250 60 69 2B 7E 36
65255 00 02 22 B0 5C
65260 C9 FE 09 20 10
65265 2A B0 5C 23 7E
65270 FE 01 C8 22 B0
65275 5C 36 00 2B 77
65280 C9 FE 0A 20 20
65285 2A B0 5C 54 5D
65290 23 7E 12 FE 01
65295 2B 0D 54 5D 23
65300 7E 12 FE 01 28
65305 04 FE 80 38 F3
65310 2B 36 00 22 B0
65315 5C C9 FE 0B 20
65320 22 2A 4B 5C 01
65325 06 00 09 44 4D
65330 2A B0 5C 54 5D
65335 E5 A7 ED 42 E1
65340 28 07 2B 7E 12
65345 FE 80 38 F0 36
65350 00 22 B0 5C C9
65355 FE 06 CA AC 0E
65360 C9 2A 4B 5C 01
65365 06 00 09 ED 4B
65370 B0 5C A7 ED 42
65375 C8 2A 4B 5C 23
65380 23 23 23 5E 23
65385 56 0B ED 43 B0
65390 5C 03 19 A7 ED
65395 42 E5 60 69 C1
65400 54 5D 1B ED B0
65405 CD 6B 0D 3E 00
65410 32 81 5C C9 2A
65415 B0 5C ED 4B F0
65420 FC A7 ED 42 01
65425 1F 00 A7 ED 42
65430 C0 22 F0 FC 21
65435 81 5C 36 80 C9
65440 2A F4 FC E5 2A
65445 4B 5C 01 06 00
65450 09 EB 06 0F 3E
65455 80 2A B0 5C 23
65460 2B E5 A7 ED 52
65465 E1 28 05 BE 30
65470 F5 10 F3 22 F4
65475 FC D1 A7 ED 52
65480 C2 7F FD C9 2A
65485 4B 5C 23 23 23
65490 23 4E 23 46 23
65495 3E 00 ED B1 28
65500 22 B0 5C CD A0
65505 FF 2A B0 5C ED
65510 4B F4 FC A7 ED
65515 42 28 09 3E 80
65520 2A B0 5C 2B BE
65525 30 FC 22 F0 FC
65530 C3 7F FD
```


SIMPLE TO USE

You want to program your own Arcade Games?

Software STUDIOS

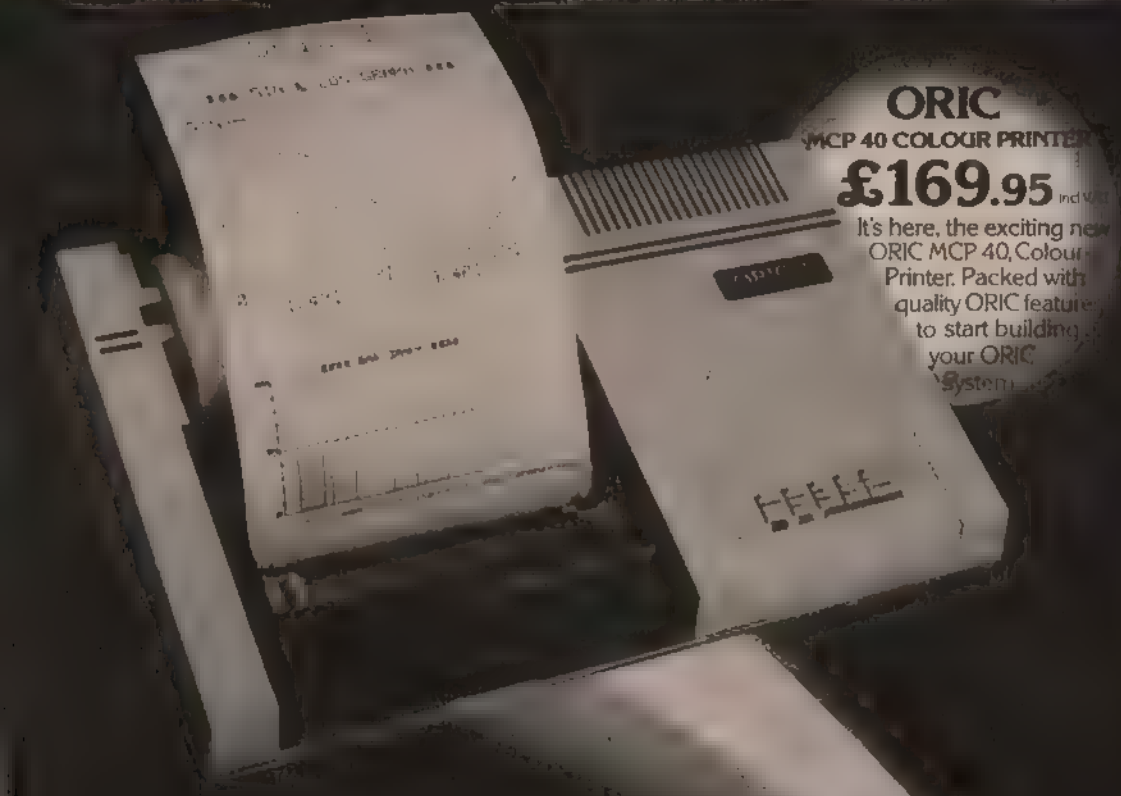
Games Designer

Now you can! Produce your own
SPRITE BASED MACHINE CODE
Arcade Games

NO programming knowledge needed
EIGHT pre-programmed games included

48K SPECTRUM
£14.95

ORIC MCP 40 COLOUR PRINTER



ORIC
MCP 40 COLOUR PRINTER
£169.95 inc VAT

It's here, the exciting new ORIC MCP 40, Colour Printer. Packed with quality ORIC features to start building your ORIC System.

Superbly styled and quality engineered to provide 4 colour hard copy, for home and business use.

Just look at these leading features:

- **Quality hard copy on plain paper**
- **Superb graphics and text capability**
- **Prints 4 colours – Red, Green, Blue and Black**
- **Designed to match the futuristic style of ORIC 1**
- **Plugs straight into your ORIC – printer lead supplied**

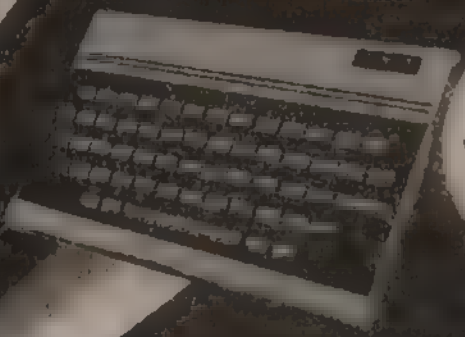
ORIC The ORIC MCP 40 – Setting new standards in Micro Computer Printers. ORIC The Real Computer System

ORIC PRODUCTS INTERNATIONAL LTD Coworth Park Mansion, Coworth Park, London Road, Sunninghill, Ascot, Berks. SL5 7SE

ORIC products available from:-
WH SMITH · DIXONS · GREENS · LASKYS · MICRO'C · MICRO PERIPHERALS · SPECTRUM · COMPUTERS FOR ALL and hundreds of independent dealers.

ORIC-1 16K & 48K

ORIC-1 16K
VALUE PACK
ORIC 16K plus £30* worth of ORIC Software for ONLY
£129.95



ORIC-1 48K
VALUE PACK
ORIC 48K plus £40* worth of ORIC Software for ONLY
£169.95

ORIC 1 16K & 48K Micros

- Superb Styling
- Ergonomic keyboard with 57 moving keys
- 28 rows x 40 characters high resolution
- Teletext/Viewdata compatible graphics
- 6 Octaves of real sound plus HI-FI output
- Centronics printer interface and cassette port
- Free user manual, cassette recorder lead and Driver game included.

ORIC 1 Todays best value in real computer systems.

To be launched within the next few weeks - the revolutionary ORIC 3" MICRO FLOPPY DISK DRIVES, with incredible access time and data storage capacity.

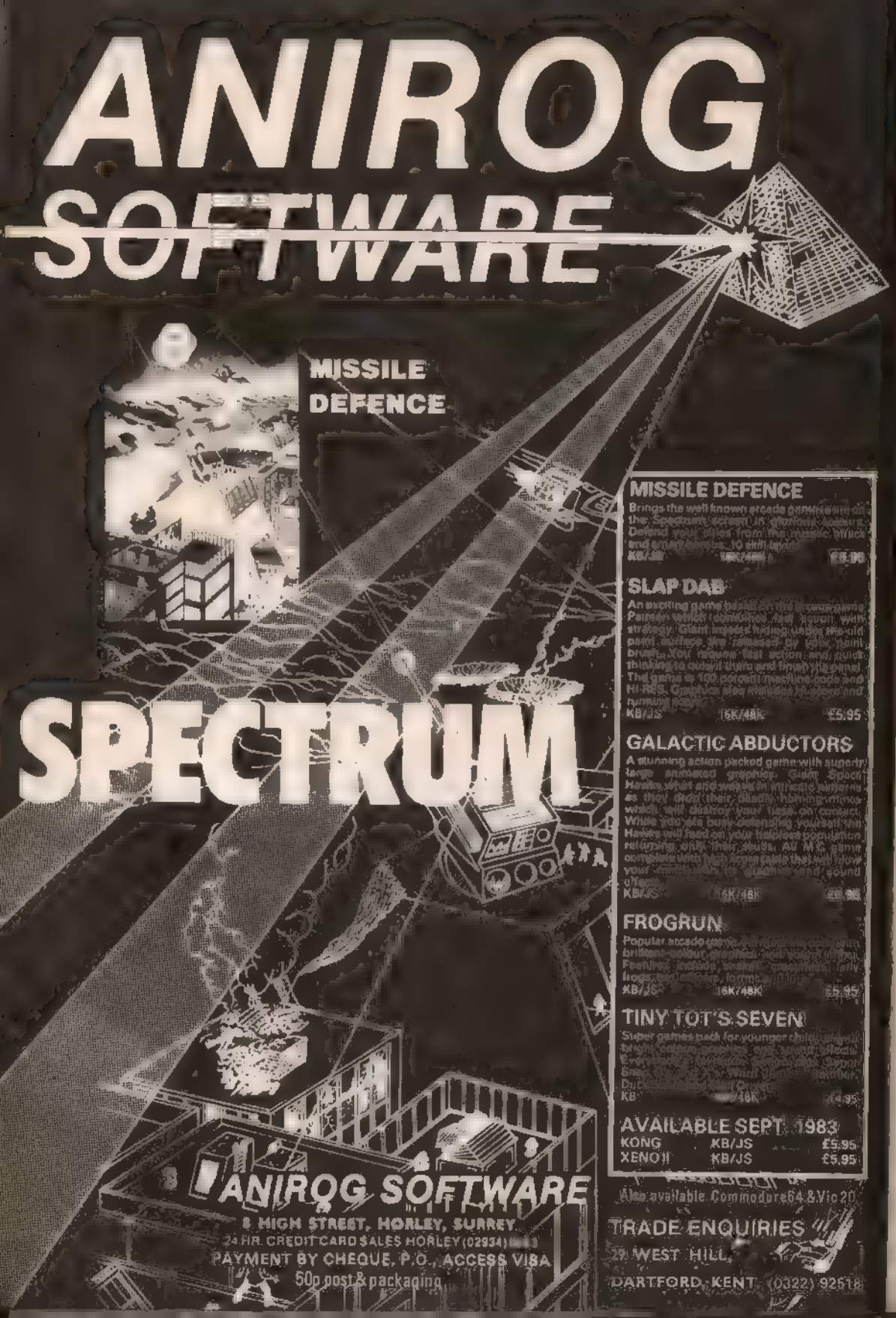
Other peripherals to be launched this year...

It is Oric's policy to continue to expand our product range, in order to offer our customers a comprehensive, professional, Micro Computer system, at a realistic price.

We believe that with the launch of our MCP 40 colour printer, and our combined computer/software value packs, we will continue to lead the small micro market in both quality and value.

*Subject to availability and the appropriate VAT.

Copyright ORIC PRODUCTS INTERNATIONAL 1983


ANIROG
SOFTWARE
MISSILE
DEFENCE
SPECTRUM
MISSILE DEFENCE
Brings the well known arcade game [illegible] the Spectrum screen in glorious colour. Defend your cities from the missile attack and smart bombs. 10 skill levels.
KB/JS [illegible] £5.95
SLAP DAB
An exciting game [illegible] Painter which combines [illegible] with strategy. Giant [illegible] the old paint [illegible] brush. You require fast action and quick thinking to outwit them and finish the panel. The game is 100 percent [illegible] and HI-RES. Graphics [illegible] and running [illegible]
KB/JS 16K/48K £5.95
GALACTIC ABDUCTORS
A stunning action packed game with superb large animated graphics. Giant Space Hawks what and where in intricate patterns as they drop their bases, [illegible] which will destroy your [illegible] on contact. While you are busy [illegible] yourself the Hawks will [illegible] your [illegible] the [illegible] and sound effects.
KB/JS 16K/48K [illegible]
FROGRUN
Popular arcade game [illegible] brilliant colour [illegible] Features [illegible] frogs [illegible] forms [illegible]
KB/JS 16K/48K £5.95
TINY TOT'S SEVEN
Super games pack for younger children [illegible] Duck [illegible]
KB [illegible]/48K £4.95
AVAILABLE SEPT. 1983
KONG KB/JS £5.95
XENO II KB/JS £5.95
ANIROG SOFTWARE
8 HIGH STREET, HORLEY, SURREY
24 HR. CREDIT CARD SALES HORLEY (02934) [illegible]
PAYMENT BY CHEQUE, P.O., ACCESS VISA
50p post & packaging
Also available Commodore 64 & Vic 20
TRADE ENQUIRIES
29 WEST HILL,
DARTFORD, KENT. (0322) 92518

Blow-up

Les Allan explains how to blow up the 64-character set to eight times normal size

This short program enables the character set to be displayed at normal and eight times normal size. Also, the Rom location and decimal number associated with each pixel row is shown.

The program works by identifying the location in the Rom character set of a character typed in at the keyboard. The eight bytes holding the character shape are read from the character set and the bit pattern translated into eight rows of eight full character positions on the screen. A reverse space character is used to represent ■ pixel set; a normal space for a pixel not set.

The screen thus displays the exact arrangement of pixels as used in the formation of the normal size character. The screen also displays the memory location of each of the eight bytes used for the character and the values stored in those locations. All the character set is available, including all upper and lower case alpha-numerics and graphics, plus all reverse video forms. The mode in which the program is currently working is selected by the use of the four function keys:

F1 — Upper case selected
F3 — Lower case selected
F5 — Normal video on
F7 — Reverse video on

Invalid entries from the keyboard, eg, 'return', 'inst/del', etc, are error trapped.

The Rem statements contained in the program listing should enable the workings to be understood — if not, here is a brief functional listing:

2	Clears screen to black with black border
4	Memory pointers
6-40	Graphics for title page
42	2½ sec delay
44	Clear screen and change colour
48-62	Set up screen
64-78	Check for keyboard entry
80	Turn off keyscan interrupt:switch ■ character
■	Read character set into Ram
84	Switch in I/O restart keyscan interrupt
86-98	Print character address/value
100-110	Upper case sub-routine
200-210	Lower case sub-routine
300-310	Normal video sub-routine
400-410	Reverse video sub-routine
500-510	Erase character address/value
600-610	Error trapping routine

Variables

I	Character shape pointer
J	Character pixel pointer
T	Delay loop counter
CH	Poke code of K$
CR	Reverse character offset
CS	Character start location
CT	Character video screen location
CO	Character colour screen location
MX	Reference in VAL calculation
VL	Value in each address for character shape
■	Keyboard entry
KK$	Keyboard memory

Note

The rate of character printing may be increased by rearranging line 94 thus:

```
94 NEXT:PRINTLEFT$(A$,7 + I). . . .
       PEEK(12288 + I):NEXT
```

```
 1 REM **** CLEAR SCREEN/COLOUR BLACK ****
 2 PRINT"■■":POKE53280,0:POKE53281,0
 4 POKE52,48:POKE56,48:CLR
 5 REM **** CTRL 8 ****
 6 PRINTTAB(17)"■■"TAB(28)"■"
 7 REM **** CTRL 2 ****
 8 PRINTTAB(16)"■■"TAB(27)"■■"
 9 REM **** CTRL 4 ****
10 PRINTTAB(15)"■■"TAB(26)"■■■"
11 REM **** CTRL 5 ****
12 PRINTTAB(14)"■■"TAB(25)"■■■■"
13 REM **** CTRL 6 ****
14 PRINTTAB(13)"■■"TAB(24)"■■■■■"
15 REM **** CTRL 2 ****
16 PRINTTAB(12)"■■■■■"TAB(23)"■■■■■■"
17 REM **** LOGO 1 ****
18 PRINTTAB(11)"■■■■■■"TAB(22)"■■■■■■■"
19 REM **** LOGO 3 ****
20 PRINTTAB(10)"■■■■■■■■"TAB(21)"■■■■■■■■■"
21 REM **** LOGO 6 ****
22 PRINTTAB(10)"■■■■■■■■"TAB(28)"■"
23 REM **** LOGO 5 ****
24 PRINTTAB(10)"■■■■■■■■"TAB(28)"■"
25 REM **** LOGO 7 ****
26 PRINTTAB(11)"■■■■■■"TAB(28)"■"
27 REM **** LOGO 8 ****
28 PRINTTAB(12)"■■■■"TAB(28)"■"
29 REM **** BLOW UP/LOGO 1 ****
30 PRINT"■■■■■■■■■
```

```
54 FORX=0TO7:PRINTTAB(6)"■ "TAB(15)" ":NEXT
56 PRINTTAB(6)"■I              "
58 GOSUB100:GOSUB300
60 PRINTLEFT$(A$,18)TAB(9)"■ ■■■■■ ■■ ■■■■"■■ ■■■"
62 PRINTLEFT$(A$,24)TAB(11)"■■ ■HIT ANY KEY ■■"
63 REM **** SCAN KEYBOARD ****
64 GETK$:IFK$=""THENCT=1231:CO=CT+54272:GOTO64
66 IFK$="■"THENGOSUB500:GOSUB100:GOTO76
■ IFK$="■"THENGOSUB500:GOSUB200:GOTO76
70 IFK$="■"THENGOSUB500:GOSUB300:GOTO76
72 IFK$="■"THENGOSUB500:GOSUB400:GOTO76
74 PRINT"■";K$:CH=PEEK(1024):KK$=K$:GOSUB500
76 IFKK$=""THEN64
78 IFK$<>" "ANDCH=32THENGOSUB600:GOTO64
79 REM **** WRITE DATA FROM ROM INTO RAM STARTING AT 12288 ****
80 POKE56334,PEEK(56334)AND254:POKE1,PEEK(1)AND251
82 FORI=0TO7:POKE12288+I,PEEK(CS+CR+CH*8+I):NEXT
■ POKE1,PEEK(1)OR4:POKE56334,PEEK(56334)OR1
85 REM **** PRINT CHARACTER/ADDRS/VAL ****
86 FORI=0TO7:VL=PEEK(12288+I):MX=128:CT=CT+40:CO=CO+40
■ FORJ=0TO7:IFVL<MXTHEN92
90 POKECT+J,160:POKECO+J,0:VL=VL-MX
92 MX=MX/2
94 PRINTLEFT$(A$,7+I)TAB(21)"■"CS+CR+CH*8+ITAB(31)"■"PEEK(12288+I):NEXT:NEXT
96 PRINT"■ ■":PRINTLEFT$(A$,19)TAB(10)CR$KK$
98 POKE198,0:GOTO64
99 REM **** UPPER CASE ****
100 PRINTLEFT$(A$,18)TAB(18)"■UPPER CASE SELECTED":CS=53248
102 POKE53272,21
110 RETURN
199 REM **** LOWER CASE ****
200 PRINTLEFT$(A$,18)TAB(18)"■LOWER CASE SELECTED":CS=55296
202 POKE53272,23
210 RETURN
299 REM **** NORMAL CHARACTERS ****
300 PRINTLEFT$(A$,20)TAB(19)"■NORMAL VIDEO ON ":CR=0:CR$="■"
310 RETURN
399 REM **** REVERSE CHARACTERS ****
400 PRINTLEFT$(A$,20)TAB(19)"■■REVERSE VIDEO ON■":CR=1024:CR$="■"
410 RETURN
499 REM **** ERASE CHARACTER/ADDRS/VAL ****
500 FORI=0TO7
502 PRINTLEFT$(A$,7+I)TAB(7)"        "TAB(22)"     "TAB(32)"   "
504 NEXT
506 PRINTLEFT$(A$,19)TAB(10)" "
510 RETURN
599 REM **** ERROR ****
600 PRINTLEFT$(A$,22)TAB(3)"■ERROR  ■NOT A PRINTABLE CHARACTER■"
602 FORT=1TO1000:NEXT
604 PRINTLEFT$(A$,22)"                                        ";
610 RETURN
700 REM ***************************
702 REM ***************************
704 REM ****                   ****
706 REM ****  CBM 64 BLOW UP   ****
708 REM ****    LES  ALLAN     ****
710 REM ****  17TH JUNE 1983   ****
712 REM ****                   ****
714 REM ***************************
716 REM ***************************
718 REM ****                   ****
720 REM **** VIC 1515 PRINTER  ****
722 REM **** VIC COLOURS ONLY  ****
724 REM ****                   ****
726 REM ***************************
728 REM ***************************
```

HERE COMES HORACE!

Just when you thought microcomputer games had nothing more to offer, here comes Horace!

It has been said that Horace games are in a class of their own; in fact, Horace is almost a legend.

Horace is a cute, lovable, animated character who races through adventures, creating havoc wherever he goes, and the good news is that Horace games are now available for most microcomputers.

When Horace was first introduced to computer owners in the game "Hungry Horace", he immediately became a cult figure, winning the hearts of thousands of computer owners. Now, you too can enjoy the hair-raising adventures of Horace.

The Horace series of games brings you splendid graphics, addictive games and a lovable mischievous character, for only £5.95 per cassette.

HUNGRY HORACE
The original Horace adventure. Horace creates havoc in the park as he picks the flowers, annoys the guards, and steals their lunch.
Patently ridiculous, but great fun.

HORACE GOES SKIING
Our hero attempts winter sports: First of all he must get to the ski shop, then lumbered with a pair of skis, he has to dodge the traffic once again to reach the snow. Skiing is complete with slalom flags, trees and moguls. So watch out, Horace!

HORACE AND THE SPIDERS
Horace's task is to rid the mountain caves of spiders. But before he can do that he must climb the mountain and reach the dreaded spider bridge. To cross it, Horace must swing from spider thread to spider thread! This game is challenging and fun with some amazing animation.

MELBOURNE HOUSE

Melbourne House Publishers

Spectrum
Spectrum versions of Horace games are available from selected branches of WH Smith, Boots and Menzies or directly from Sinclair Research Ltd

Commodore 64
Commodore 64 Hungry Horace £5.95
Commodore 64 Horace Goes Skiing £5.95

Dragon 32
Dragon 32 Hungry Horace £5.95

All prices include VAT where applicable. Please add 80p for post and pack.

I enclose my cheque/money order for £

Please debit my Access Card No

Expiry date

Signature

Name

Address

Postcode

£

£ + p/p 80

Total £

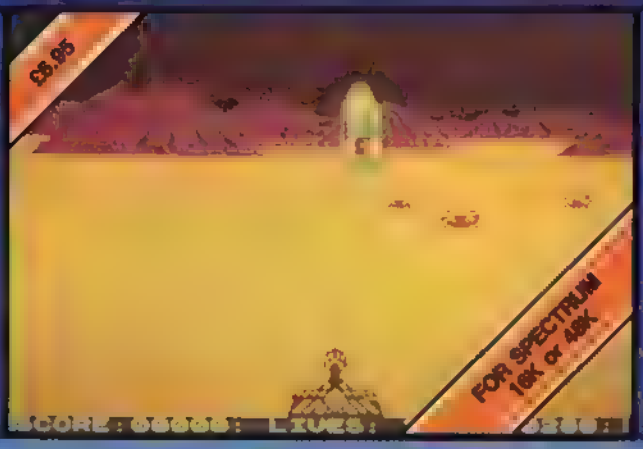
Orders to: POP2/9
131 Trafalgar Road
Greenwich London SE10

Correspondence to:
Melbourne House
Church Yard Tring
Hertfordshire HP235LU

Trade enquiries welcome

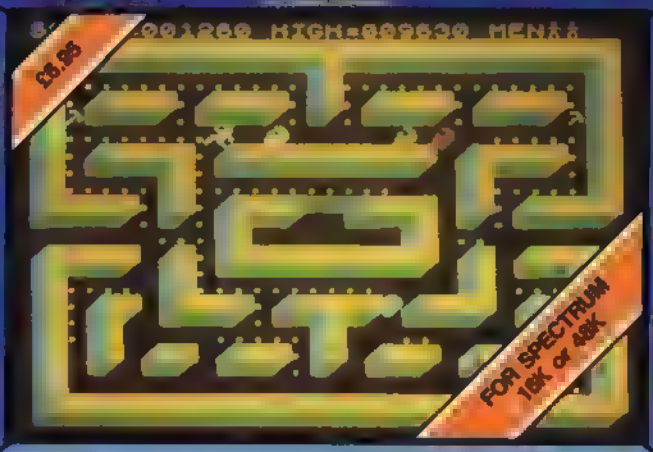
All Melbourne House cassette software is unconditionally guaranteed against malfunction. Access orders can be telephoned through on our 24 hr answerphone (01) 8587397

MICROMEGA



3D

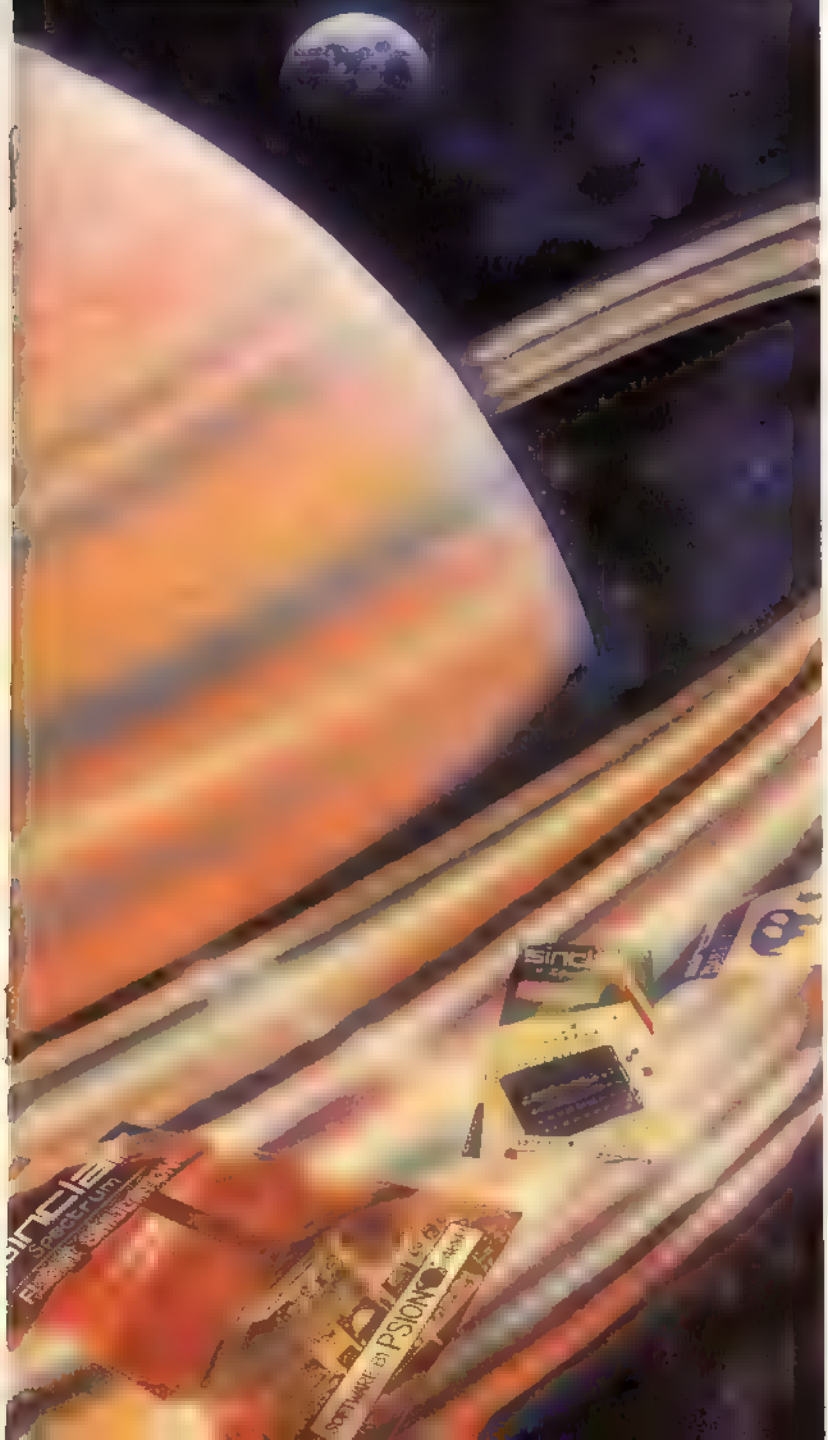
3D



3D

3D

THE BEST SOFTWARE ON EARTH COMES FROM PSION.



Psion is the source for the best software programs you'll ever see on a Sinclair Spectrum.

Our range runs rings round other software. In short, it's faster, livelier and more colourful.

Why?

Ideas. At Psion, they're bigger and more ambitious.

We combined a 12,000-word dictionary with complex logic – and the result is spectacular: our Computer SCRABBLE® program. Then there's the 'Horace' series...

It's all down to programming skill. Flight Simulation – a 'real-time' program – is a special breakthrough in this field. Few other programs make such full use of your Spectrum's capabilities.

In all, there are 12 challenging titles, published exclusively under the Sinclair label. (Not counting the free 'Horizons' cassette that introduced you to your computer.)

Psion programs for the Spectrum:

- Flight Simulation (48K)
- Chess (48K)
- Space Raiders
- Planetoids
- VU-CALC
- VU-FILE
- VU-3D (48K)
- Hungry Horace
- Horace and The Spiders
- Horace goes Skiing
- Backgammon
- Computer SCRABBLE® (48K)

"Horace" series produced in conjunction with Melbourne House
SCRABBLE® trademark and copyright licenced by Scrabble Schutzrechte und Handels GmbH - a J. W. Spear and Sons PLC subsidiary

Unbelievable? A recent W H Smith chart of best-selling Spectrum programs speaks for itself. No less than 7 of the top 12 cassettes are by Psion. And there's more to come. Watch out for our very latest program, 'Chequered Flag.'

In fact, if you're choosing software for your Spectrum, there's just one way to find the best...

Look for the Psion symbol on the cover of the cassettes.

PSION

Cuthbert Goes Walkabout

Cuthbert is o
the Lunar Landing
Pad, waiting for the Federal
State Visit. He must turn th on
by walking across the switc
located at the corners of th res,
before the invading Moronians get him.
Watch him do his Victory
he tackl next "Pad" and
larger, Moronian Invaders.
you ge ame in the Hall of

Supe
accor

All Cassettes
£8 each
(Includes VAT & Postage)

AVAILABLE FROM
DRAGON 32
DEALERS
NATIONWIDE
OR ORDER DIRECT
FROM:

MICRODEAL

41 Truro Road St. Austell
Cornwall PL25 5JE
Tel: 0726 67676

Send 1st class stamp for FREE Software Lists for Dragon and Tandy range of computers.

AVAILABLE FROM SELECTED
Boots
and
John Menzies
SHOPS

Letters of credit

***Andrew Homer** explains how to generate simple video titles using a micro*

The production of suitable titles and credits for video recordings, produced with simple camera systems, can cause something of a problem. The excellent results produced by modern video cameras and recorders are often spoilt by the lack of effective titles and credits.

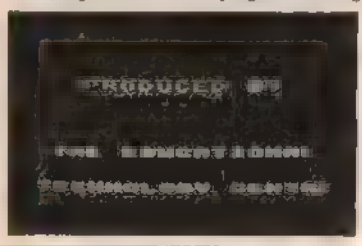
At Dudley College of Technology we have, in the past, made use of dry transfer lettering sheets which are, unfortunately, both time consuming and expensive. However, it is possible to produce effective titles directly on to video tape, quickly and inexpensively, without the use of a video camera.

Effective titles have been produced at Dudley by using a BBC microcomputer (model A or B) as a character generator and coupling it directly into a VHS video recorder. Any computer with UHF or Video output sockets could be used for this purpose, although the BBC machines offer large size characters in Mode 5 and a video output socket. A typical program to produce simple video titles on a BBC machine is shown in Example 1.

Example 1
Program notes

Line	
10	Selects the MODE. Selecting a MODE also clears the screen
20	Removes the flashing cursor from the display in any MODE. Without this line the cursor would be present throughout the recording
30	Waits for a character key to be pressed before carrying on to the next statement
40	Prints the title on the screen. Spaces between words can be increased if necessary to balance the text. Horizontal position is determined by the number in brackets after the TAB statement. The number represents character spaces across the screen. Vertical position is determined by the apostrophe marks after the PRINT statement. Each apostrophe moves the title one line down the screen. TAB (X,Y) could be used in place of the apostrophe as shown in Example 2
50	As line 30
60	Clears the screen
70	As line 30
80	Ends the program

When the program is Run, a completely blank screen appears. Touching a character key brings up the first title. Touching the key again produces another blank screen. The program is ended by again touching the key. Although very simple, a series of effective titles can be generated frame by frame as shown in Example 2. A squared grid, printed on paper, corresponding to the screen display, is useful if a number of frames are to be produced. Best results are usually obtained by having a blank screen at the beginning and end of the sequence.



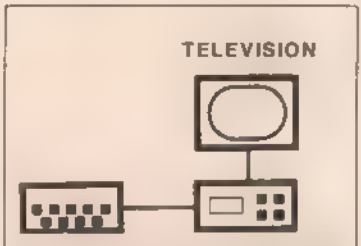


Figure 1

In order to record the titles on to video tape, the computer must be coupled directly into the video recorder. The BBC machines, in common with many other systems, have both UHF and video output sockets. For best results, the video output socket on the computer should be connected to the video input socket on the video recorder with a suitable lead.

Unfortunately, the video output connection on the BBC machine, unless modified, gives a black and white picture. However, for simple titles, consisting of white letters on a black background, the improved picture quality obtainable through this connection makes its use well worthwhile.

If the UHF socket is to be used, it should be connected to the aerial input socket on the video recorder with the lead supplied with the computer. This connection will require a spare channel on the video recorder to be tuned in to the output signal from the computer.

Whichever connection is used, a UHF television receiver must be connected and tuned to the output from the video recorder in the normal way. If connected properly, the computer's visual display should appear on the television screen. The equipment should be connected as shown in Figure 1.

Titles stored in the computer as print statements can then be recorded on to video tape as required. Cassette or disc storage can, of course, be employed if the titles are likely to be needed again. Computer generated titles should not be recorded on to the front of existing programmes as severe disturbances can occur when the picture changes from titles to program content. In order to avoid such disturbances the following sequence should be employed:

(1) Record the opening titles (computer)
(2) Record the program content (video camera or second recorder)
(3) Record the closing credits (computer)

If a video recorder with insert editing facility is available, computer generated titles can be inserted at any point in an existing program. Music can be used with the title and credit sequences by connecting a cassette recorder to the audio input socket of the video recorder.

Although the production of very simple titles and credits has been described here, there is obviously plenty of scope for more ambitious graphics, such as larger size letters, if required. The titles and credits produced by this simple method have proved to be extremely effective when used with our own two-camera video system.

Example 1

```
10 MODE 5
20 VDU 23;8202;0;0;0;
30 X=GET
40 PRINT''''''TAB(3);"TITLES PROGRAM"
50 X=GET
60 CLS
70 X=GET
80 END
```

Example 2

```
10 MODE 5
20 VDU 23;8202;0;0;0;
30 X=GET
40 PRINT TAB(4,9);"DEMONSTRATION"
50 PRINT TAB(3,12);"TITLES  PROGRAM"
60 PRINT TAB(6,19);"A.J.HOMER"
70 X=GET
80 CLS
90 PRINT TAB(7,13);"THE END"
100 X=GET
110 CLS
120 X=GET
130 END
```

JUMBLY
JUMBLY
JUMBLY

BRIDGE

BBC'B' **ORIC 48K**

ICB Bridge is a sophisticated bridge game for a single player, the other three hands are bid and played by the computer.

Features: **Random Deal**
Natural "Acol-type" Bidding
With: **Jump Bids**
Strong Two Bids
Stayman
Advanced Play routines
Only **£10.50 including P&P**

Send Cheque or PO to
ICB ENTERPRISES
33 BURNT STONES DRIVE
SHEFFIELD S10 5TT

Tel: (0742) 302050

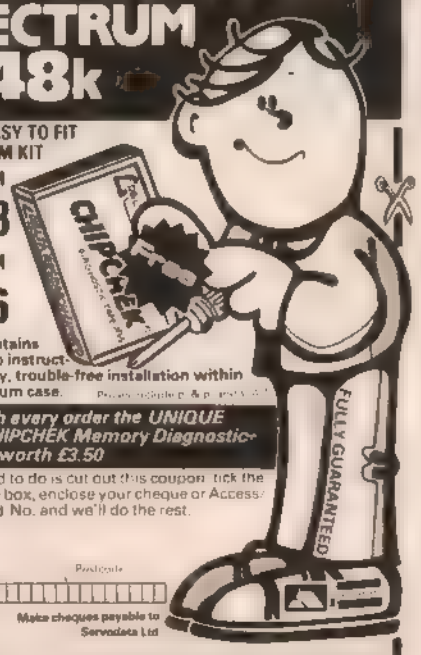
DEALER ENQUIRIES WELCOME

UPGRADE YOUR SPECTRUM to 48k

with an EASY TO FIT DELTA-RAM KIT

SPECTRUM 1 £33

SPECTRUM 2 £26



Each kit contains step by step instructions for easy, trouble-free installation within your Spectrum case.

FREE with every order the UNIQUE DELTA CHIPCHEK Memory Diagnostic-Cassette worth £3.50

All you need to do is cut out this coupon, tick the appropriate box, enclose your cheque or Access/Barclaycard No. and we'll do the rest.

Name
Address

Postcode

Access or Barclaycard Number

Make cheques payable to Servodata Ltd

DELTA RESEARCH LIMITED
10a The Broadway Newbury Berkshire RG13 1BA
Tel:0635 45373

NEW

For use with DRAGON 32 COMPUTER

The complete speech synthesis system

SPEECH SYNTHESIS MODULE
for the Dragon 32 computer

- Fully cased module plugs into cartridge port
- Unlimited vocabulary, using allophone-type, dedicated speech chip
- Approximately 250 words predefined; accessed by entering word required
- Complete control using five new BASIC commands
- Speech can easily be incorporated into existing BASIC programs
- Up to 40 words spoken from one command; speech can occur simultaneously with graphics
- **£37.95** inclusive

Also available: SOUND EXTENSION MODULE for use with the Dragon computer — provides facility to play chords and harmonies over five octaves — easy to use via BASIC — built-in sound effects — music and graphics can occur simultaneously — two I/O ports — user manual — ONLY **£34.95** inclusive

ACCESS/Cheque/PO to:

J.C.B. (MICROSYSTEMS)
29 Southbourne Road, Bournemouth, BH6 5AE
Tel: (0202) 423973

Write or phone for further details

Angling for a line

Ian Barker presents a simple 3D graphics program for the Dragon 32

The Dragon's *Draw* command is easy to use, but it is also very limited. This program is based on the Draw command — it allows you to draw lines in *Pmode 4* at any angle (to vertical) and of any length.

Constructing irregular shapes requires the calculation of the cartesian co-ordinates of each line's end points. This program calculates these *x,y* co-ordinates for a given set of polar co-ordinates (*R, A1* and *A2*). *R* is the length of the line and *A1* its angle (in degrees) to the vertical (*X*) axis. 3D drawings can be achieved by entering positive or negative angles for *A2*.

Instructions and the *x, y, z* axes are presented at the beginning of the program — the axes and associated polar co-ordinates (*R, A1* and *A2*) are also shown in Figure 1.

The program is controlled by the user with the variable *C*. Initially, the starting point of the drawing will have to be entered *x1* and *y1*. This can be done by entering *C=1* and then *x1* and *y1* (*x1=0–255* and *y1=0–192*). The length of line and its angle(s) are then entered. A quick view of the hi-res screen is given while printing out the values of *x1, y1, x2* and *y2*, where (*x1, y1*) and (*x2, y2*) are the ends of the line.

The program then asks for the next line's *C* value — if *C=0* then the next line continues from the end of the first line. If *C=2* is entered, the drawing is shown until the spacebar is pressed to return to the program. *C=1* is used to move the drawing position of point (*x1, y1*) of the next line in a similar manner to the *Draw* command's blank move.

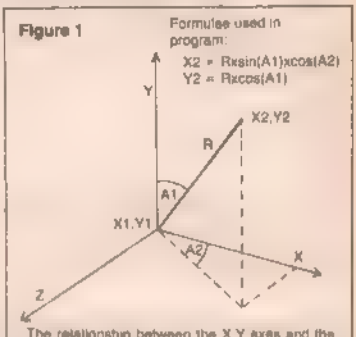
The accompanying table gives some values for the variables *C, R, A1, A2, x1* and *y1*, used to draw a regular hexagon. It may be noted that this figure is impossible to draw using the *Draw* command.

LINE NU	C	R	A1	A2	X1	Y1
1	1	70	[illegible]	0	125	96
2	0	70	60	[illegible]	—	—
3	0	70	120	[illegible]	—	—
4	[illegible]	70	180	[illegible]	—	—
5	[illegible]	70	240	[illegible]	—	—
[illegible]	[illegible]	70	300	0	—	—

Notes

Enter each line (1-6) before proceeding to the next one
X1 and *Y1* are entered for line 1 only. These are entered when asks 1
R is length of line in pixels
A1 and *A2* are the angles of the line to the vertical and horizontal axes, respectively (*Y* and *X* axes)
Return can be used whenever 0 is the value entered, thus speeding up entry of the parameters considerably
The hexagon can be made to appear to turn out of the plane of the screen by entering positive or negative values for *A2* whilst keeping *R* and *A1* the same

Figure 1



The relationship between the X,Y axes and the Polar co-ordinates R,A1,A2.

```
10 REM* 3-D GRAPHICS*
20 REM*BY I K BARKER
30 REM MAY,1983
40 CLS PRINT"A UTILITY P
ROGRAM BY I K BARKER"
50 PRINT"                MA
Y.83"
60 PRINT
70 LINEINPUT"ARE INSTRUC
TIONS REQUIRED(Y/N)?";A$
80 IF A$<>"Y"ANDA$<>"N"
THEN70
90 IFA$="Y"THEN GOSUB 49
0
100 PCLS
110 REM*DRAWING ROUTINE*
120 PMODE4,1
130 PRINT
140 PRINT"C=0   TO CONTI
NUE DRAWING FROM
POINT"X2","Y2
150 PRINT"C=1   TO DRAW
LINE FROM A NEW
POINT(X1,Y1)"
160 PRINT"C=2   TO VIEW
SCREEN                  (P
RESS SPACEBAR TO CONTINU
E)"
170 PRINT"      INPUT VA
LUE OF C FOR
LINE"S+1 INPUTC
180 IFC<0ORC>3 THEN120
190 ON C GOTO 210,440
200 X1=X2:Y1=Y2 GOTO220
210 INPUT" INPUT NEXT PO
INT  X1,Y1,";X1,Y1
220 INPUT"INPUT POLAR CO
-ORDS  R,A1,&A2";R,A1,A2
230 A1=180-A1
240 A1=A1*ATN(1 0)/45
250 A2=A2*ATN(1 0)/45
260 X2=R*SIN(A1)*COS(A2)
+X1
270 Y2=R*COS(A1)+Y1
280 D=X2-FIX(X2) D1=Y2-F
IX(Y2)
290 IFD>=.445THENX2=FIX(
X2)+1ELSEX2=FIX(X2)
300 IFD1>=.445THENY2=FIX
(Y2)+1ELSEY2=FIX(Y2)
310 IFX1<0ORX1>256 THEN4
70
320 IFX2<0ORX2>256THEN47
0
330 IFY1<0ORY1>192THEN47
0
340 IFY2<0ORY2>192THEN47
0
350 LINE(X1,Y1)-(X2,Y2),
PSET
360 IFS=0THENPRINT@2,"L
INE  (X1,Y1)-(X2,Y2)"
370 PRINT"      LINE(X1,
Y1)-(X2,Y2)"
380 S=S+1 PRINT"NU"S"("X
1","Y1")-("X2","Y2")"
390 PRINT
400 PRINT@-2,S""X1,Y1"-"
X2,Y2
410 SCREEN1,0
420 FORG=1TO1500 NEXT
430 GOTO110
440 SCREEN1,0
450 IF INKEY$="" "THEN110
460 GOTO450
470 PRINT"OUT OF RANGE "
..."X1="X1,"X2="X2,"Y1"Y1
,"Y2="Y2 PRINT
480 X2=X1 Y2=Y1 PRINT"RE
-ENTER" GOTO110
490 REM**INSTRUCTIONS FO
R MAIN PROGRAM**
500 CLS PRINT@32,"INSTRU
CTIONS".
510 PRINT@64,"press spac
ebar TO VIEW THE AXES AN
D POLAR CO-ORDINATES R,A1
,& A2 ALSO press spacebа
r TO RETURN TOTEXT  pres
s d TO START DRAWING "
520 PRINT@227,"C=0,1 OR
2 CONTROLS THE MAIN
  PROGRAM"
530 PRINT@291,"R=LENGTH
OF LINE IN PIXELS"
540 PRINT@355,"A1=ANGLE
OF LINE IN DEGREES
  FROM VERTICAL AXIS"
550 PRINT@451,"A2=ANGLE
OF LINE IN DEGREES
  FROM HORIZONTAL AXIS"
560 IF INKEY$="" " THEN59
0
570 IF INKEY$="D"THEN RE
TURN
580 GOTO 560
590 REM**THE AXES DRAWN*
*
600 PMODE3,1 PCLS SCREEN
1,0
610 DRAW"S6"
620 DRAW"BM100,96;C4NU70
NR10RNG55"
630 DRAW"C2E45C3D91NH44E
45BM100,74;R2D2R2D2R2D3R
1BM121,96;D2L2E2L2D2EL2D2
L2"
640 DRAW"BM90,20C4U5NH<3E
3"
650 DRAW"BM248,90NE60M+6
,+8 H6"
660 DRAW"BM18,162NR6UE6U
L6"
670 DRAW"C2BM135,47U8R4F
D2G4L3F4"
680 DRAW"BM107,70U4NR3U3
R4D7BM+4,+4U7"
690 DRAW"BM124,114,U4NR3
U3R4D7BM+3,+0,NR4E6U2L2D
6D"
700 DRAW"BM176,38;E4BM+0
,+4,H4F4BM+6,+0,L3E3H2D5
"
710 DRAW"BM+6,+4,G2E2"
720 DRAW"BM+4,-1;U3NH2E2
"
730 DRAW"BM+7,+5;L3E3H2G
D"
740 DRAW"BM55,180;E4;BM+
0,+4;NH4;BM+6,+0,NU4;BR4
;NG3BR4,U2NH2E2;BM+3,+4;
U4"
750 IF INKEY$="" " THEN
500
760 GOTO 750
```

AGF PROGRAMMABLE JOYSTICK INTERFACE for Spectrum or ZX81

ONLY 32.95 +£1.00pp

ABOUT OUR PROGRAMMABLE INTERFACE

Surpassing the outstanding specification of our Interface Module II which still offers the best software support at its price, a Joystick Interface that is compatible with ALL SOFTWARE through its unique hardware programmable design.

The Interface plugs on to the rear connector of your ZX81 or ZX Spectrum.

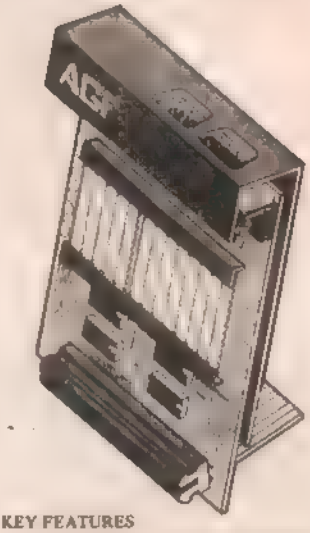
Quick clip-on connections, which are configured from a reference card supplied, allow you to define which of the forty keys are simulated by which action of the Joystick. A pack of ten Quick Reference Programming Cards makes setting for your favourite games even easier. These can be filled in to show at a glance the configuration required and stored in the cassette case of the particular game. When you change to a game using different keys the module is re-programmed in a few seconds.

As with our Interface Module II the Programmable Interface accepts all standard switch Joysticks that are Atari-compatible. Two sockets are available which are connected together for two player games which use the same keys for both players.

The Interface resides in the keyboard address space and does not affect its operation or interfere with any other add-ons. A rear extension edge connector will accommodate expansion of your system.

The unique AGF key simulation principle makes it extremely easy to incorporate Joystick action in your own programs. All eight directions and fire are read by simple BASIC.

With every order comes a free demonstration program called 'Video Graffiti' plus a full set of instructions.



KEY FEATURES

- Programmable design gives TOTAL software support.
- Accepts Atari, Competition Pro, Wico, Starfighter, Quick Shot, Le Stick etc.
- Rear extension connector for all other add-ons.
- Free demo program and instructions.

PACKAGE CONTENTS SUPPLIED

- Programmable Interface Module as illustrated, complete with clip-on programming leads.
- Self adhesive programming chart detailing how to define which key is simulated by UP, DOWN, LEFT, RIGHT, and FIRE. This can be fixed on to the case of your computer or if preferred the protective backing can be left on. The chart is made of a very durable reverse printed plastic and is extremely easy to read.
- One pack of ten Quick Reference Programming Cards for at-a-glance setting to your games requirements. The card allows you to mark the configuration in an easy to read fashion with space to record the software title and company name.
- Video Graffiti demonstration program which is written totally in BASIC to illustrate how all eight directions and fire can be read. This is also a useful high resolution drawing program.
- 12 months guarantee and full written instructions.

JOYSTICKS

ATARI CONTROLLERS

FOR USE WITH OUR INTERFACE Module or VIC 20, Commodore 64, Atari VCS, Atari 400, Atari 800

If you require extra Joysticks for our original interface module mark order 'OLD' Joysticks

ONLY £7.54 inc VAT + P&P

FROM: MR/MRS/MISS

ADDRESS

SEND C.W.O. (NO STAMP NEEDED) TO: A.G.F. HARDWARE, DEPT PCW

FREEPOST, BOGNOR REGIS, WEST SUSSEX, PO22 9BR

QTY	ITEM	ITEM PRICE	TOTAL
	PROGRAMMABLE INTERFACE	33.95	
	JOYSTICK(S)	7.54	
	PACK(S) QUICK REFERENCE CARDS	1.00	
ONE	VIDEO GRAFFITI	FREE	
ZX81 ☐ ZX SPECTRUM ☐ Please tick		FINAL TOTAL	

DEALER ENQUIRIES WELCOME *EXPORT PRICES ON APPLICATION*

***Open Forum* is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed. We will pay the *Program of the Week* double our new fee of £6 for each program published.**

Balloons

on Spectrum

This is an amusing game for either machine. The game starts with a small introduction, a balloon rising up to a dart and bursting.

The introduction also shows you the control keys, and tells you that by pressing two keys at once you can move diagonally. This is done by using the function *In* to control movement. The *Border* and *Paper* colours are *Poke*d in, rather than entered from *Basic*, to avoid any risk of interfering with *In* (lines 40-50).

The object of the game is to steer a dart so that it bursts the balloon which appears in random positions on the screen, and to do so in the shortest time possible. To make things harder, every so often the balloon shifts to a new position. At the end of the game the Spectrum will give you a report on how well you played. Do not be offended if it is rude to you at first: you will soon get better.

If you find the game too hard you can change line 720 to read:

720 IF a/30 <> INT(a/30) THEN GO TO 390

My high score is 100.

Variables

high	=	high score
p	=	vertical co-ordinate for dart
p1	=	horizontal co-ordinate for dart
p2	=	vertical co-ordinate to delete dart
p3	=	horizontal co-ordinate to delete dart
a$	=	dart
lives	=	time/25
a	=	time counted
b	=	vertical co-ordinate for balloon
c	=	horizontal co-ordinate for balloon
r$	=	report

Graphics

Line 210 — graphic E
Line 220 — graphic A
Line 250 — graphic C,E,D,B
Line 480 — graphic I
Line 490 — graphic H
Line 500 — graphic G
Line 510 — graphic F

```
  10 REM Balloon © R.Smith
  20
  30 LET high=0
  40 POKE 23624,48
  50 POKE 23609,48
  60 INK 2: CLS
  70
  80 REM user graphics
  90
 100 DATA 60,110,94,125,125,60,8
,6
 110 DATA 0,128,76,255,76,128,0,
0,0,1,50,255,50,1,0,0
 120 DATA 0,0,20,20,0,0,28,42,42
,28,8,8,20,28,8,8
 130 DATA 128,64,56,56,59,4,10,8
,16,80,32,220,28,28,2,1
 140 DATA 1,2,20,20,220,32,80,16
,8,10,4,59,56,56,64,128
 150 RESTORE 80: FOR n=0 TO 71
 160 READ c: POKE USR "a"+n,c
 170 NEXT n
 180
 190 REM intro
 200
 210 PRINT AT 0,7; INK 2; PAPER
6; FLASH 1;"BURST THE BALLOON";
PRINT INK 1;AT 2,15;"!"
 220 FOR n=21 TO 3 STEP -1: PRIN
T AT n,15; INK 4;"■"; BEEP .1,20
-(n*1): PRINT AT n,15;" ": NEXT
 n: BEEP .1,-30: PAUSE 11
 230 INK 4: PRINT AT n+1,14;"\!/
";AT n+2,14;"- -";AT n+3,14;"/!\
"
 240 INK 2: PAUSE 11: CLS
 250 PRINT AT 0,8;"C O N T R O L
S";AT 2,10;"↖ ↑ ↗";AT 3,10
;"1  2  3  4";AT 21,0;"Any key t
o play"
 260 PRINT AT 5,0;"To move diago
nally press 2 keys": PAUSE 0
 270
 280 REM game start
 290
 300 CLS
 310 LET lives=5
 320 LET a$="!"
 330 LET score=0
 340 LET a=0
 350 LET p=5: LET p1=6
 360 LET p2=p: LET p3=p1
 370 LET b=INT (RND*20)+1
 380 LET c=INT (RND*30)+1
 390 IF POINT (0,10)=0 THEN INK
0: DRAW 255,0: DRAW 0,175: DRAW
-255,0: DRAW 0,-175: INK 2
 400 IF lives=1 THEN GO TO 770
 410 PRINT AT b,c; INK 4;"■"
 420 IF score>high THEN LET high
=score
 430
 440 REM move dart
 450
 460 LET p=p+(IN 63486=253 AND p
<20)-(IN 63486=251 AND p>1)
 470 LET p1=p1+(IN 63486=247 AND
p1<30)-(IN 63486=254 AND p1>1)
 480 IF IN 63486=252 THEN IF p<2
0 THEN IF p1>1 THEN LET p=p+1: L
ET p1=p1-1: LET a$="↗"
 490 IF IN 63486=243 THEN IF p>1
 THEN IF p1<30 THEN LET p=p-1: L
ET p1=p1+1: LET a$="↙"
 500 IF IN 63486=245 THEN IF p<2
0 THEN IF p1<30 THEN LET p=p+1:
LET p1=p1+1: LET a$="↘"
 510 IF IN 63486=250 THEN IF p>1
 THEN IF p1>1 THEN LET p=p-1: LE
T p1=p1-1: LET a$="↖"
 520 IF INKEY$="1" THEN LET a$="
«"
 530 IF INKEY$="4" THEN LET a$="
»"
 540 IF INKEY$="2" THEN LET a$="
!"
 550 IF INKEY$="3" THEN LET a$="
¡"
 560 PRINT AT p,p1; INK 1;a$
 570 IF p2<>p OR p3<>p1 THEN PRI
NT AT p2,p3;" "
 580
 590 REM burst balloon
 600
 610 IF p=b AND p1=c THEN LET sc
ore=score+10: BEEP .1,-30: PRINT
 AT b-1,c-1; INK 4;"\!/";AT b,c-
1;"- -";AT b+1,c-1;"/!\": CLS :
GO TO 370
 620 IF p<>b OR p1<>c THEN
 630
 640 REM scoring
 650
 660 PRINT AT 21,23;"HIGH=";hi
;AT 21,0;"TIME=";a;AT 21,12;"1
=";score;AT 0,7;"
 670 LET a=a+1
 680 IF p<>p2 OR p1<>p3 THEN PRI
NT AT p,p1;" "
 690
 700 REM timer
 710
 720 IF a/25<>INT (a/25) THEN GO
 TO 390
 730 LET lives=lives-1: CLS : GO
 TO 370
 750 REM dead
 760
 770 IF lives=1 THEN LET r$="";
LET r$=("Terrible! " AND score<5
0)+("Well done! " AND score>=50)
+("Brilliant! " AND score>=70)+(
"Amazing!" AND score>=100)
 780 IF lives=1 THEN PRINT AT 10
,INT (31-LEN r$)/2;r$;AT 21,0;"T
IME=100";AT 21,12;"1UP=";score;A
T 21,23;"HIGH=";high;AT 11,7;"A=
another, S=stop": IF r$="" THEN
LET r$="Very good.": GO TO 780
 790 IF lives=1 THEN IF INKEY$="
s" THEN POKE 23692,56: POKE 2362
4,56: CLS : STOP
 800 IF INKEY$="a" THEN GO TO 40
 810 IF lives=1 THEN GO TO 790
```

Balloons
by R Smith

NEW
Sunshine presents a new star game for the ZX Spectrum (16 or 48K)
BLIND ALLEY
Cruising on Broadway
Behind the wheel of your machine. Cruising on Broadway. You look mean. People stop to stare. Suddenly a black-and-white pulls onto the Broadway behind—its light flashing and siren wailing. The chase is on!
Cruising on Broadway is a tyre-burning fast machine-code game for the 16 & 48K Spectrum. The further you can get the more difficult it becomes—cash prizes are being offered each month for the highest scores.
£4.95
Blind Alley
A deadly duel, deep in space. Blind Alley is what passes for sport in the year 3017. You crash must use strategy to outwit and bound the opponent—in this crazy development of the pursuit games of the late 2000s. After each round in the endeavour game more players are sent against you to test your skill and agility. Blind Alley is the machine-code action of the future—now for the 16 & 48K Spectrum.
£4.95
2 cassettes
& 2 books from Sunshine
The Working Spectrum
(228 page book)
The first well-documented collection of serious programs for the ZX Spectrum. Programs include a Basic Renumber which can handle Gotos and Gosubs, a character dictionary, a file-handler, several utility programs and a few games. Each program is built up out of [illegible] subroutines.
£5.95
THE WORKING SPECTRUM
A LIBRARY OF PRACTICAL SUBROUTINES AND PROGRAMS
DAVID LAWRENCE
The Working Dragon 32
The Working Dragon 32
This is a companion volume to The Working Spectrum and includes several new features such as a Text Editor and a Music Composer and Editor. Other programs help you use the Dragon 32 as a accountant, for more advanced high resolution graphics, as a home tutor for education and for playing games. Each of the programs and subroutines is explained line by line to help develop your own programming skills.
£5.95
Submit your program to Sunshine and your name could be here next month.
SUNSHINE
Please send me
The Working Spectrum
Cruising on Broadway
The Working Dragon 32
Blind Alley
Sunshine Books
12-13 Little Newport Street London WC2R 3LD

EAT YOUR HEART OUT GEORGE LUCAS!

ASSASSIN SOFTWARE

(in collaboration with Buccaneer)

Presents

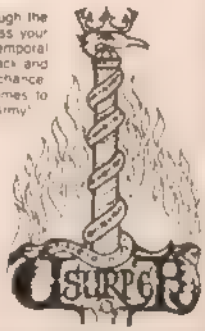
USURPER

In versions for the 16K or 48K Spectrums featuring conflict, gambling and The Unge. Plus game map and rules for Board Game option

THE FIRST MULTI-PLAYER ADVENTURE GAME

1-10 (48K) or 1-4 (16K) players wade through the gamut of Beasts, Men and Monsters! Amass your forces and wealth. Seek the aid of powers temporal and spiritual (but beware the Undead). Attack and weaken the other players if you get the chance. When you are strong enough the time comes to overthrow the King or be crushed by his Army!

The first part of a trilogy



£6.50 P&P incl

Cheque POs payable to Town Nathan

10 ASH ROAD, LEEDS 6

Tel Leeds 744235

MAZEMAN For the LYNX....

SPECTROID STORM. A fast action graphic space game. You dodge asteroids and zap aliens in this cosmic battle for the stars. There are bonus points to be scored for the sharp shooter with the speedy ship. The whole of hyper-space lies waiting for you when you pile on the super thrust. — Spectrum £4.45 — NEW

FORTH. A full implementation allowing the full range of sound and colour. The only Spectrum package endorsed by the Forth Interest Group and the one used by Sinclair User in their series on Forth. "... well worth the price ... for a speedier Spectrum." *Personal Computer* — Spectrum £4.95

THE WIZARD'S VARRIORS. A fast moving game featuring continuous sound effects and arcade quality graphics. "... a well written graphics adventure." *Home Computing Weekly* — Spectrum £4.95

ADVENTURE ONE. With save game facility. "... a remarkably good version ... well worth the money." *Sinclair User* — Spectrum £6.95 — ZX81 £5.95

MAZEMAN. NOW AVAILABLE FOR THE LYNX £4.95. A fast action machine code game. "... a very accurate and fast." *Which Micro* — Spectrum £4.35 — ZX81 £4.45

CHESS. Ten levels of play. Good graphic display. "... in a class of it's own." *Your Computer* — ZX81 £5.95

INVADERS: Very fast m/c action. Includes mystery ship and increasingly difficult screens. — ZX81 £4.45

ABERSOFT DEPT POP

7 MAES AFALLEN, BOW ST, DYFED, SY24 5BA

Dealer enquiries are welcome

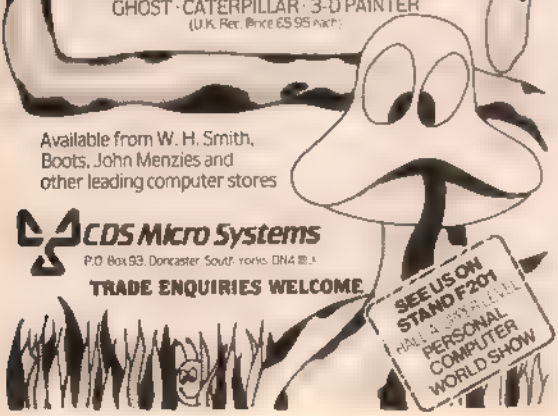
Zahn & Sagarone 0970 828851

NEW **Another winner from CDS!**

SPECTRUM POOL

THE LATEST GAME IN A GREAT RANGE OF SPECTRUM AND ORIC SOFTWARE INCLUDING REVERSI · LEAPFROG · BOZY BOA · GOBBLE A GHOST · CATERPILLAR · 3-D PAINTER

(U.K. Rec. Price £5.95 each)



Available from W. H. Smith, Boots, John Menzies and other leading computer stores

CDS Micro Systems

P.O. Box 93, Doncaster South Yorks DN4 8LA

TRADE ENQUIRIES WELCOME

Alien Maze

on Vic20

Realising that all your friends have been eliminated it is your duty to revenge their deaths. What was it that massacred the whole crew (except you, the last survivor)? Are you to be destroyed like the rest? Are you doomed to die?

The biggest space villain of them all has planted a bomb on your ship, no ordinary bomb though. It's the latest technology, a homing bomb and once it's locked on to your position you've had it.

Locked in the engine room, you must avoid this new weapon and reach the flashing cross, then press space for another life, but hurry — it may disappear suddenly.

The controls are, *A* — up: *Z* — down: *X* — left: *C* — right and space bar to jump the bomb and get an extra man when under the flashing cross. Random missiles also travel across the screen adding to your troubles.

Program notes

0	subroutine to set variables and screen
1-13	m/c data for ladders
18-26	random missile
27-32	sound effects of missile
36-79	moves man
125-249	checks missile and prints cross
220-360	moves homing bomb
2000	routine to end
2100-2500	set variables and screen
3000-3060	checks man's position, if below half of screen then homing bomb goes down ladders, if above then homing bomb goes up ladders
3100-3121	bonus man
3210-3240	blowing up procedure
3350-3380	no men left, blowing up procedure, scrolls screen
4000-4096	set up screen

```
 0 GOSUB2100
 1 N=820
 2 READD:IFD=-1THENGOTO18
 3 POKEN,D:N=N+1:GOTO2
 4 DATA169,107,162,0,157,70,30,157,92,30,157,114,30,157,136,30,157,158,30,162,15
4
 5 DATA157,15,30,157,37,30,157,59,30,157,81,30,157,103,30,157,96,30,157,118,30
 6 DATA157,140,30,157,162,30,157,184,30,157,189,30,157,211,30,157,233,30,157,255
30
 7 DATA162,255,157,176,30,169,64,162,0,157,71,30,157,93,30,157,115,30,157,137,30
 8 DATA157,159,30,157,170,30,157,192,30,157,214,30,157,236,30,162,176,157,82,30
 9 DATA157,75,30,157,97,30,157,119,30,157,141,30,157,163,30,157,168,30,157,190,3
0
 10 DATA157,212,30,157,234,30,162,255,157,177,30,162,0,169,115,157,72,30,157,94,
30
 11 DATA157,116,30,157,138,30,157,160,30,157,171,30,157,193,30,157,215,30,157,23
7,30
 12 DATA162,176,157,83,30,157,76,30,157,98,30,157,120,30,157,142,30,157,164,30,1
57,169,30
 13 DATA157,191,30,157,213,30,157,235,30,162,255,96,-1
 18 POKE36,32:POKE1,15:S=250:V=15:A=INT(RND(1)*6):IFAU=1THENA=6
 19 IFAU=2THENA=2:IFA=2THENQ=7810:AU=0
 20 IFA=3THENQ=7898:SS=7801
 21 IFA=4THENQ=7986:SS=7889
 22 IFA=5THENQ=8074
 23 IFA=6THENQ=7766:P=100:AU=0:SS=7713
 25 IFPEEK(Q-1)<>102THENPOKEQ,P:POKEQ-1,31:Q=Q-1:GOTO27
 26 POKEQ,P:POKEQ+19,31:P=32:GOTO18
 27 POKE36877,S:POKE8113,115
 30 IFPEEK(Q)=PEEK(Z)THENGOSUB3210
 32 SYS820:POKEZ,65:POKEA1,81:POKE36,43
 36 BU=PEEK(197):LL=PEEK(Z-1):MR=PEEK(Z+1)
 40 IFBU=26ANDLL<>102ANDPEEK(Z-2)<>113ANDPEEK(Z-2)<>32THENPOKEZ,100:POKEZ-1,65:Z
=Z-1
 42 IFPEEK(Z)=PEEK(A1)THENGOSUB3210
 45 IFZ<8076THENGOTO50
 47 IFPEEK(Z-5)=PEEK(DP)THENPOKEDP-22,32:POKEDP,76:GOTO50
 48 IFPEEK(Z-3)=PEEK(DP)THENPOKEDP,100:POKEDP-22,101:GOTO50
 49 IFPEEK(Z+1)=PEEK(DP)THENPOKEDP-22,32:POKEDP,76
 50 IFBU=34ANDMR<>102ANDPEEK(Z+2)<>113ANDPEEK(Z+2)<>32THENPOKEZ,100:POKEZ+1,65:Z
=Z+1
 52 IFPEEK(Z)=PEEK(A1)THENGOSUB3210
 55 IFBU=32ANDPEEK(Z-44)ANDPEEK(Z-22)=32THENPOKEZ,100:POKEZ-22,65:Z=Z-22
 57 IFPEEK(Z-22)=43THENGOSUB3100
 60 IFBU=17ANDPEEK(Z-22)=64THENPOKEZ,64:POKEZ-22,65:Z=Z-22
 55 IFZ<7850THENAU=2
 56 IFZ<7820THENAU=1
 70 IFBU=33ANDPEEK(Z+22)=64THENPOKEZ,64:POKEZ+22,65:Z=Z+22
 125 IFPEEK(Q-1)<>102THENPOKEQ,P:POKEQ-1,31:Q=Q-1:GOTO220
 130 POKEQ,P:POKEQ+19,31:P=32:GOTO18
```

```
 220 POKES3,91 POKES1,S-1 POKES2,V V=V-1 POKEA1,100 POKEA1+D1,81 A1=A1+D1
 260 IFPEEK(A1+22)=64ORPEEK(A1+22)=65THENGOSUB3057
 280 IFPEEK(A1+D1)=102THEND1=-D1
 300 IFPEEK(A1-22)=32ANDD1=-22THENKL=0 GOSUB3000
 310 IFPEEK(A1+22)=113ANDD1=22THENGOSUB3000
 315 IFKL=1THENGOTO340
 320 IFPEEK(A1-21)=115THENGOSUB3050
 340 IFPEEK(A1)=PEEK(DP)THENPOKEA1,100 A1=7766 D1=-1
 350 IFPEEK(Z)=PEEK(A1)THENGOSUB3210
 360 IFME=0THENGOTO2000
 370 IFPEEK(Z)=PEEK(Q)THENGOSUB3210
 380 IFPEEK(Z+22)=100THENPOKEZ,32 POKEZ+22,85 Z=Z+22
 390 IFPEEK(A1-2)=PEEK(Z)THEND1=-1
 400 IFPEEK(A1+2)=PEEK(Z)THEND1=1
 1990 POKES3,96 GOTO25
 2000 GOTO3350
 2100 GOSUB4000 PRINT"□" A1=7756 D1=-1 S1=36877 S2=36879 ME=3 ML=8144 S3=36876 S
9=7713
 2101 DO=76 DP=8101 POKE8077,99 FORI=8142TO8185 POKEI,102 NEXTI
 2110 POKE8078,77 POKEML,193 POKEML-1,193
 2120 M=7680 Z=8099 Q=8074 POKE7810,31 POKE7809,31 POKE7808,31 F=32
 2130 POKE8074,31 FORI=1TO6 FORK=MTOM+21 POKEI,111 POKEK-22,100 NEXT M=M+88 NEXT
I
 2140 FORI=7680TO8164STEP22 POKEI,102 POKEI+21,102 NEXTI S=200
 2500 RETURN
 3000 IFZ<A1THEND1=-1
 3028 IFZ>A1THEND1=1
 3029 IFZ<A1-20THEND1=1
 3030 RETURN
 3050 IFZ<A1-20THEND1=-22 KL=1 RETURN
 3055 RETURN
 3057 IFZ>A1+20THEND1=22 RETURN
 3060 RETURN
 3100 POKEZ,32 Z=8099 POKES1,0 FORD=1TO11 L=220 J=20 FORI=1TO8 POKES3,L-J J=J-3
 3120 FORK=1TO1 NEXTK NEXT NEXTD
 3121 ME=ME+1 ML=ML+1 POKEML,193 POKES3,0 RETURN
 3210 POKEZ,65 J=20 POKES1,0 POKES3,0 FORI=1TO20 C=250
 3220 FORI=1TOJ POKES1,C-2 C=C-2
 3230 NEXTI C=C-10 J=J-1 NEXTK POKES2,0
 3231 POKEZ,32 ME=ME-1 POKEML,102 ML=ML-1 IFME=0THENSYS820 GOTO3350
 3233 Z=8099 IFPEEK(A1-2)<>32ANDPEEK(A1-1)<>113THEND1=-1
 3240 RETURN
 3350 POKES2,15 POKES1,0 M=15 POKES3,M PRINT"■WANT ANOTHER GO (Y,N)?■" GOSUB3364
 POKES3,0
 3352 FORI=1TO23 FORK=1TO10 NEXTK SYS59765 FORP=1TO10 NEXTP NEXT
 3354 RUN
 3355 POKE198,0 WAIT198,1
 3360 IFPEEK(197)=28THENEND
 3361 RETURN
 3362 GOTO3355
 3364 POKES3,0 FORI=250TO210STEP-1 POKE36876,I FORK=1TO60 NEXTK,I POKES2,M M=M-1
 3365 IFM<=20THENPOKE36878,0 POKE36876,0 RETURN
 3367 GOTO3364
 3368 POKES3,0 POKES2,0 CLR RUN
 3370 POKES3,0 POKES2,0
 3380 GOTO3360
 4000 PRINT"□■" POKE36879,9 PRINT"      ■ALIEN ATTACK"
 4097 POKE198,0 WAIT198,1
 4098 RETURN
```

Alien Maze
by Fiwad Moied

Wizard Software

FOR DRAGON 32
ZX SPECTRUM 48K
ORIC-1 48K

DRAGON STAR TREK — **DRAGON 32** — **£8.45**
A real time version featuring a 10 × 10 galaxy, shield control, photon torpedoes, status reports, signals received, galactic search, scanner control, warp drive, star bases with docking, black holes, planets and planet landfall, pulsars, novas, stars, asteroids, meteors, shuttles and shuttle docking, automatically converging and attacking Klingons. Four levels of difficulty, comes with instruction manual.

TIME PORT 1 — **DRAGON** — **£8.45**
ZX SPECTRUM 48K — **£6.95**
The first in a series of five adult strategy adventure games. Direct your robot and acquire the object that the Keeper will ask for and bring it safely back to the Time Port.

EVICTOR — **DRAGON 32 and ORIC-1 48K** — **£7.95**
ZX SPECTRUM 48K — **£5.95**
An original arcade game presented in high resolution graphics with machine code for extra zip. Evict the aliens from their self-regenerating and defended base. Features lasers, phasors and bombs. Five skill levels. Dragon 32 and Oric-1 versions feature a demonstration mode.

RECOMMENDED ■■ THE MICROCOMPUTER SOFTWARE CLUB

All prices inclusive. Mail order. Cheques or postal orders to

WIZARD SOFTWARE, DEPT. PCW, PO BOX 23
DUNFERMLINE, FIFE KY11 5RW

Also available from software retailers in UK, Europe and Africa.
Send large SAE (7in × 5in.) for full program catalogue.
Royalties paid for superior quality DRAGON 32 and ORIC-1 software

ANNOUNCING

THE QUILL

FOR THE 48K SPECTRUM AT £14.95

The Quill is a major new utility written in machine code which allows even the novice programmer to produce high speed machine code adventures of superior quality to many available ■ the moment without any knowledge of machine code whatsoever.

Using a menu selection system you may create well over 200 locations, describe them and connect routes between them. You may then fill them with objects and problems ■ your choice. Having tested your adventure you may alter and experiment with any section with the greatest of ease. A part formed adventure may be saved to tape for later completion. When you have done so the Quill will allow you to produce a copy of your adventure which will run independently of the main Quill editor, so that you may give copies away to your friends. The Quill is provided with a detailed tutorial manual which covers every aspect of its use in writing adventures. It is impossible ■ describe all the features of this amazing program ■ such a small space, so we have produced a demonstration cassette which gives further information and an example ■ its use. This cassette is available at **£2.00** and the Quill itself is **£14.95.**

ALSO NEW FOR THE 48K SPECTRUM:
DIAMOND TRAIL
The latest of our machine code adventures sets you the task of recovering the Sinclive diamond. But first you must overcome many problems in a city fraught with danger and intrigue.

GILSOFT

30 Hawthorn Road, Barry, South Glamorgan CF6 8LE. Tel: (0446) 736369

TELEPHONE YOUR ORDER WITH

Our Software is available from many computer shops nationwide, or direct from us by post or phone. SAE for details. Dealer enquiries welcome. Some of our main wholesalers are:

UK	— PCS Distribution, Darwen, Lancs. Tel: (0254) 691211.2
Holland/Belgium	— Aashima Trading BV, Groenebaal 53, 3011SN, Rotterdam
Sweden	— Riko Data, Box 2082, S-230 41 Bara, Sweden
Denmark	— Quan-Soft, Vesterbrogade 127 E Mz Tv, 1620 Copenhagen V
South Africa	— Universal Sources (Pty) Limited, Durban, Natal.

VCS **ATARI** 400/800

Vic20 • PHILIPS
INTELLIVISION
CARTRIDGE LIBRARY

AUTHORISED DEALER

- All the latest games
- Fast reliable service
- Life membership now £10
- Fortnightly or monthly hire
- p&p inc. in hire charges
- Discounts on purchases for members (hardware and software)
- Descriptive catalogue

HIRE CHARGES: 2 WKS £3.00 — 4 WKS £5.00
JOIN NOW ON MONEY BACK APPROVAL
OR SEND SAE FOR DETAILS
To: MDM, HOME COMPUTER SERVICES, DEPT 5
20 NAPIER STREET, NELSON, LANCS BB9 0SN

OLTROSOFT

MAIL ORDER ONLY

CUT PRICE

31 KEITH PARK ROAD
UXBRIDGE, MIDDLESEX UB10 0QR

DRAGON

MICRODEAL: Android Attack, The King, Alcatraz Defense, Escape, Shuttle, Invaders Revenge, Galactic Ambush, Frogger, Scarfman
RRP £8.00 Our Price £7.75

COMMODORE ■■

INTERCEPTOR
Frogger, Crazy Kong, Sportsman, Panic, Scramble, Star Trek
Our Price £6.45

LLAMASOFT
Gridrunner — Our Price £4.80
Laser Zone, Matrix, Mutant Camels — Our Price £6.50

VIC20

IMAGINE
Arcadia, Catcha Snatcha, Frantic, Wacky Waiters, Bewitched
Our Price £5.00

INTERCEPTOR
Galaxians, Alien Attack, Crazy Kong
Our Price £5.50

SPECTRUM

ULTIMATE: Jet Pack, Pssst, Cookie, Trans Am
RRP £5.50 Our Price £5.00

IMAGINE
Arcadia, Jumping Jack, Ah Diddums
ZZoom 48K, Zip-Zap 48K, Schizoids
Our Price £5.00

SEND CHEQUE or POs or Send SAE for List Stating Machine

WHY PAY MORE?

WIN THE POOLS?

48k

SPECTADRAW 2

A Pools Prediction Program for the 48K ZX Spectrum microcomputer. The program looks at the recent form of the teams playing in each week's English and Scottish football league matches and then refers to a large database to see what has happened in the past when teams with similar form met. It can then identify the matches which are likely to yield draws and output suitable predictions.

The program is supplied complete with a database tape containing data on over 7,500 matches, and a comprehensive instruction manual.

For £12.95 inclusive (cheques/POs payable to S. S. McAlley).
SPECTADRAW, 1 COWLEAZE, CHINNOR, OXFORD, OX9 4TD

ROSE SOFTWARE

EDUCATIONAL SOFTWARE FOR THE 16K or 48K SPECTRUM

1. INTERMEDIATE MATHS 1 — Long Multiplication, Long Division, Highest Common Factor, Lowest Common Multiple, Fractions 1 (+ and −). Fractions 2 (× and ÷)
2. INTERMEDIATE MATHS ■ — Areas, Perimeters, Simple Equations, Percentages, Sets, Venn Diagrams
3. INTERMEDIATE ENGLISH 1 — Meanings ■ Words, Parts of Speech, Proverbs, Similes, Anagrams
4. INTERMEDIATE ENGLISH 2 — Opposites ■ Words, Idioms, Group Terms, Odd Word Out, Spellings

We have a large selection of educational programs for the Spectrum. Cassettes £5.95 each (inc. p&p), or send sae for catalogue ■.

ROSE SOFTWARE
148 Widney Lane, Solihull, West Midlands B91 3LH
(ZX81 programs also in stock)

Character

on BBC Micro

This is a utility program for the BBC Model A or B. It enables easy programming of the user defined character set by positioning a cursor using the four cursor control keys and then pressing the space bar to set or reset the selected pixel.

The program when run prompts for the character number. This must be in the range 224 to 255. The character's present shape is then displayed full-size in mode 1 graphics. As each pixel is altered on the main grid the actual character is also changed.

The pixels shown on the drawing grid are normally reset or coloured red, when set they change to yellow. When you are satisfied with the shape you require, press return to enter the character into the user character set.

The whole user set is shown from character 224 to 255 and is updated each time a new character is entered.

Below the character set display is the current character VDU line code, showing in decimal the value of each row of pixels (these also change as each pixel is set/reset).

After you have entered a character into the graphics set by pressing return, you will again be prompted for the next number to be programmed. The drawing grid will remain as for the last character, so if the next shape to be set up is drastically different from the last it may be quicker to press "c" to clear the drawing grid and start afresh.

Leave the program by pressing escape which sets mode 7 screen and restores the cursor keys to normal.

```
 10 REM CHARACTER DEFINER
 20 REM written by Robert Buttery
 30 REM 4 June 1983
 40 REM
 50 REM
 60  ON ERROR GOTO 1020
 70 MODE1
 80 @%=4
 90 DIM A(8,8),count(8)
100  PROCinit
110 PROCgetchar
120 *FX4,1
130 PROCsetchar
140 VDU31,1,1
150 REPEAT
160   BIT=GET
170   IF BIT=139 AND Y>1 THEN Y=Y-1
180   IF BIT=138 AND Y<8 THEN Y=Y+1
190   IF BIT=136 AND X>1 THEN X=X-1
200   IF BIT=137 AND X<8 THEN X=X+1
210   IF BIT=32 THEN PROCchangebit
220   IF BIT=13 THEN PROCsetchar:PROCgetchar
230   IF BIT=67 THEN PROCclear
240   VDU31,X,Y
250   UNTIL FALSE
260
270
280 DEF PROCchangebit
290 IFA(X,Y)=2 THEN A(X,Y)=1 ELSE A(X,Y)=2
300 PROCgetvalue
310 ENDPROC
320
330
340 DEFPROCgetvalue
350 count(Y)=0
360 FORI%=1TO8
370   COLOURA(I%,Y)
380   IFA(I%,Y)=2 THEN count(Y)=count(Y)+2^(8-I%)
390   PRINTTAB(I%,Y)"*"
400   NEXTI%
410 PROCsetchar
420 ENDPROC
430
440
450 DEF PROCgetchar
460 PROCdisplayset
470 PRINTTAB(32,4)"      "
480 COLOUR3: PRINTTAB(15,4)"Enter CHR$ number ";
490 INPUT num
500 IF num <224 OR num >255 THEN 470
510 PRINTTAB(15,4)"CHR$ ";num;" = ";CHR$num;"
520 VDU31,X,Y
530 COLOUR1
540 ENDPROC
570 DEF PROCsetchar
580  VDU23,num,count(1),count(2),count(3),count(4),count(5),count(6),count(
7),count(8)
590 COLOUR3
```

LOOK FOR THE 'ULTIMATE' NAME FOR THE 'ULTIMATE' GAMES
'JET PAC'
'COOKIE'
'PSSST'
'TRANZAM'
Post this coupon now, to ULTIMATE PLAY THE GAME, The Green, Ashby de la Zouch, Leicestershire LE6 5JU.
Please send me the following
JET PAC
TRANZ AM
I enclose cheque/PO for £
Name
Address
PSSST
COOKIE
£5.50 each
including VAT, first class postage and packing in UK

```
600 PRINTTAB(26,4)CHR$num
610 PRINTTAB(0,22)num$" = "::FORI=1TO8:PRINTcount(I)::NEXT
620 MOVE0,350:DRAW0,250
630  ENDPROC
640
650
660 DEF PROCdisplayset
670 COLOUR3
680 VDU31,0,12:FORI%=224 TO 255 STEP 8
690   PRINTI%"  ";
700   FORJ%=0 TO 6:PRINTCHR$(I%+J%);" ";:NEXTJ%:PRINTCHR$(I%+J%);" ";I%+7
710   PRINT
720   NEXTI%
730 COLOUR2
740 PRINTTAB(1,29)"SPACE=Set/Reset    RETURN=Store char.    'C'=Clear char.
 ESCAPE=Quit"
750 COLOUR3:GCOL0,2
760 MOVE0,400:DRAW1279,400
770 DRAW1279,660
780 DRAW0,660
790 DRAW0,400
800 MOVE0,350:DRAW0,250
810 DRAW1279,250:DRAW1279,350:DRAW0,350
820 ENDPROC
830
840  DEF PROCinit
850 COLOUR1
860 FORY= 1TO8
870   count(Y)=0
880   FORX=1 TO 8
890     A(X,Y)=1:PRINTTAB(X,Y)"*"
900     NEXTX:NEXTY
910 X=1:Y=1
920 VDU31,1,1
930 ENDPROC
940
950
960 DEFPROCclear
970  PROCinit
980 PROCsetchar
990 ENDPROC
1000
1010
1020 MODE7:*FX4
1030  END
```

Character
by R Butley

6,000 FREE TAPES TO BE GIVEN AWAY

Sunshine is giving away 6,000 software tapes — for free. All you have to do is cut out and fill in this coupon, together with the coupons in the next four issues. As soon as you have collected five coupons, post them to:
Popular Computing Weekly Tape Offer
12-13 Little Newport Street, London WC2R 3LD
But, remember you are limited to one tape per person and there is a limit of 1,000 tapes per game.

Rules
1) Each entry must consist of five coupons cut from the magazine
2) You may only order one tape per person
3) There is a limit of 1,000 tapes per game
4) No correspondence will be entered into
5) No employees of Sunshine Publications Ltd, or their families, will be eligible to enter

...e treasure (no mean feat in itself), has to ...en leave the castle (in which, of course, ...e adventure is set), and get to the ...eighbouring forest, where he or she can ...eposit the goodies and get the points. ...haron would like to know how to get out ... the treasure.

Richard Ashley tells me that there ... the ...ld sinkhole down which you may jump. ...t, while this manoeuvre will indeed take ...u to the forest, there ... a small snag — ...u may also drop some of the treasure.

One or two intrepid labyrinth-wanderers ...ave written to say that they find the "Please come, you're our only hope . . . There is an address on the other side of the paper, and pausing only to crack the second oldest joke in Chandler take-offs (a man passed me, "You got a light, Mac?", I asked "No, but I got a dark brown overcoat!", he replied), Dan Diamond hurries ... the obligingly eerie graveyard, and Franklin's Tomb.

"Taking my Courage in one hand, and leaving the Whitbread behind (yup, that's the oldest one), I strolled up to the door. Suddenly the ground gave way beneath me, and I found myself falling, falling . . ."

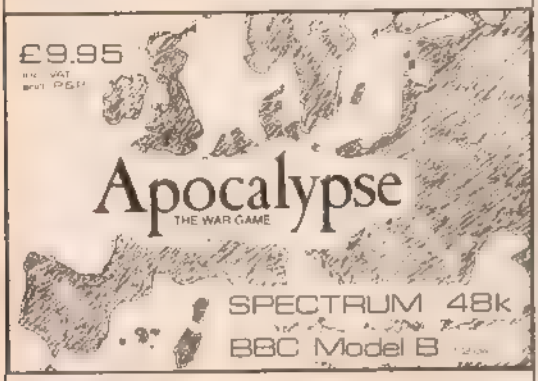
...warning for the occasion: *Never anger a dragon, he might fume!*

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So, if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further, write to: Tony Bridge, Adventure Corner, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

RED SHIFT

APOCALYPSE

A new concept in computer gaming.
A multi-player game of strategy and diplomacy, designed to be expanded and manipulated, the game places YOU in POWER. Each game contains four maps. The BBC version is over 68K of program and data and the Spectrum totals over 90K.
PLAY IT BEFORE YOU'RE IN IT!



Coming soon:

VOLUME 1 — 6 new maps.
VOLUME 2 — 4 historical scenarios — specialist rules cover the collapse of the Roman Empire, WW II, 1984 and the Napoleonic Wars.

Available from
RED SHIFT Ltd, DEPT BRENDA
12c Manor Rd, Stoke Newington, London N16. Tel: 800-1333

Produced under licence from Games Workshop, London

Spectrum
PROGRAMMABLE
JOYSTICK INTERFACE

★ REVOLUTIONARY NEW CONCEPT
★ PHYSICALLY MICRO DRIVE COMPATIBLE
★ UNIQUE "WIZARD" PROGRAM CARD

ONLY £26.35 + £1.00 p&p

SPECIAL FEATURES.

- **NO** software involved
- **NO** trailing wires
- **NO** crocodile clips
- 8 directions - fire
- 2 players
- Take any **ATARI** type joystick, ie: competition pro-Commodore — Starfighter — Quick Shot — Joy Sensor, etc . . .
- **TOTALLY** compatible with **ALL** software this interface brings **ARCADE ACTION** in seconds!

To add joystick action to ALL your GAMES simply plug the interface on to your Spectrum edge connector, set its unique "plug-in" program card and you are ready to bring full life out of your software.
Once easily set for your favourite game, using the quick programming chart, the card (reprogrammed in seconds if required) can be kept with your software. Ready for use in any time.
No reprogramming, messing around with wires or chips needed.
Supplied with: Program Cards and quick programming chart

PLEASE MAKE CHEQUES/POs PAYABLE TO.

WIZARD PRODUCTS
PO BOX 25, LEIGHTON BUZZARD,
BEDS LU7 7NE

DEALER ENQUIRIES WELCOME

Dragon Dungeon

DRAGON USERS CLUB

Why is the User Club at the Dungeon the biggest in existence, with members in 23 countries?

Is it the fact that 'Dragon's Teeth', the club's monthly magazine, is packed with news, information and advice? Or is it the fact that members easily save their subscriptions on just a few of the special membership offers?

DRAGON STICKS

If you want the latest switch-type, self-centring joysticks (best for the up/down, left/right arcade games) we've got them at £19.95 per pair.

If you want the famous 'Quick-Shot' aircraft-type sticks (no expensive adapter required) we've got them at £15.95 each.

But if you want the ultimate analogue sticks, with the best fire button available, then you have to get QD

TRANZAM

TRANZ AM - The High

TRANZ AM - Tim Hartnell

TRANZ AM - Richard Wilcox

TRANZ AM for the

Welcome, phone (0530) 411485

Please send me the following

TRANZ AM

PSST

COOKIE

Please make cheque/PO for £

Name

Address

These games should be available from W. H. SMITH, LASKYS, SPECTRUM CENTRES, OTHER LEADING ALL GOOD MAJOR SOFTWARE RETAILERS.
ULTIMATE PLAY THE GAME for immediate despatch of your order as normally despatched within 24 hours.

£5.50 each
including VAT, first class postage and packing in UK.

Double diamond

Deep in the darkest Home Counties, the Taylor family, for some time now, have been Dragon-punching, in an attempt to solve *Madness and the Minotaur*.

This adventure, from Dragon Data, has been one of the perennial brainbusters for the machine and has prompted many letters to this column, with pleas for help. The main problem used to be the Great Mushroom Hunt, but now most people seem to be able to find it. Michael Vesey, however, wonders what to do with it, once it has been found. You won't learn any spells without it, Michael — be patient.

Mark, Amanda and Dad Taylor, though, have found many objects (like food, water, bottle, dagger and golden flute), although they don't seem to have been able to get at the leather shield by jumping for it.

Apart from satyrs, sprites and troglodytes, they have also met the Oracle, who has imparted several cryptic clues to the Taylors.

I would make a note of all the clues, famille Taylor, the information is bound to come in handy when you meet the creatures. Incidentally, you should resist the temptation to eat the food (is it mushroom soup?) at an early stage!

Frank Goldberg of Ealing also enjoys *M&M*, but complains about the lack of a *Save* routine. It's a pity that this particular adventure, which seems to be an intricate and lengthy quest, cannot be halted at mid-game and returned to at another time.

Sharon Austin, of Margate, while calling *M&M* "certainly the best in my collection (of programs)", is having great difficulty in restraining herself from smashing the computer. The trouble stems, largely, from the fact that the adventurer, having collected the treasure (no mean feat in itself), has to then leave the castle (in which, of course, the adventure is set), and get to the neighbouring forest, where he or she can deposit the goodies and get the points. Sharon would like to know how to get out with the treasure.

Richard Ashley tells me that there is the odd sinkhole down which you may jump. But, while this manoeuvre will indeed take you to the forest, there is a small snag — you may also drop some of the treasure.

One or two intrepid labyrinth-wanderers have written to say that they find the random elements of *M&M* rather unsettling. Far from being random, however, the elements that change throughout the game depend on the player's actions at various points.

As an example, if the player deposits an object at a certain location, that object is randomly relocated, unless the player has previously deposited an object at another location. This kind of intricate manoeuvring can, of course, be frustrating until the key to the puzzle is found, but is immensely rewarding once cracked.

Madness and the Minotaur is described by Dragon Data as a "fascinating real-time adult strategy game", in which you can pass the time "doing battle with ferocious beasts". It's one of several adventures from this company, some of the other titles being *Quest, Black Sanctum, Calixto Island, Dragon Mountain* and *El Diablero*.

Now, if you are playing *Ring of Darkness* at the moment, you might find these tips of Tony Fowler's useful in your wanderings. You could gain some useful information in the pub, says Tony — but how to get people talking in a pub? Second, when the monster is in the distance, you may find it useful to have a noisy weapon. Finally, be very careful when attacking other characters — some are unbeatable.

Ring of Darkness is from Wintersoft — but they, and Dragon Data, are not the only software house producing adventures for the Dragon (Dragon Data are merely the glossiest). Salamander Software have just released a rather nice one called *Franklin's Tomb*. It's the first, they say, of a projected series, all using "a different approach to other adventures, in that the graphics are supplied in a separate manual".

The separate manual is certainly a lavish affair, being a 20-page casefile, "fully illustrated", as Salamander say. Well, 13 of the pages are fully illustrated with pretty pictures of the major locations.

But let Salamander's very own private dick set the scene: "My name is Diamond, Dan Diamond (known as Double Diamond, no doubt — TB). I'm a cop, at least, I used to be. My beat is the city, a seething kaleidoscope of human emotion and solid steel. It was a muggy Monday morning, the sort of day that just lies there like a dead fish, staring at you. Suddenly, the door opened and she walked in. You could cut paper with the creases in her uniform . . ."

That's enough, you get the picture.

The broad has delivered a letter, saying: "Please come, you're our only hope . . ." There is an address on the other side of the paper, and pausing only to crack the second oldest joke in Chandler take-offs (a man passed me. "You got a light, Mac?", I asked. "No, but I got a dark brown overcoat!", he replied), Dan Diamond hurries to the obligingly eerie graveyard, and Franklin's Tomb.

"Taking my Courage in one hand, and leaving the Whitbread behind (yup, that's the oldest one), I strolled up to the door. Suddenly the ground gave way beneath me, and I found myself falling, falling . . ."

And this is where you come in! To the accompaniment of the *Pink Panther* theme (don't ask me why), the title page gives the player another look at the letter (zero points to Salamander, here, for lack of imagination in designing the title page, a deficiency I've noticed in all Dragon programs — prove me wrong). Then the screen clears, to make way for the display that will stay up for the rest of the game.

On the left, are brief descriptions of the location you are currently at, along with what you can see. On the right is the inventory panel, in which the player will see a list of what is being carried at any time. A three-line box at the bottom of the screen is reserved for the player's input, and the computer's replies.

The input should take the usual form, ie, verb and noun, as in "*Take Lamp*" and so on — though, as this program is "Dragon Data approved", and as *Madness and the Minotaur* does not always follow this format, it may be worth trying other combinations of words.

Franklin's Tomb is written in Basic, but is reasonably fast in execution. It seems a little illogical in layout — from the starting location, I went first of all to the east. Later, I tried going west, and found exactly the same things happening to me. Well, maybe it's a mirror adventure.

FT, unlike *M&M* has a *Save* feature (as well as red herrings and blue kippers). It doesn't have a *Score* routine, however — in reply to your request for your score so far, the program just says: "this isn't a football match". Some of the traditional magic words are recognised, so try anything that comes to mind.

All in all, good value, I think, and a game which should keep the old grey cells ticking over for a day or two. As I hinted before, *Franklin's Tomb* is the first in a series of related adventures, and some of the clues in the present program should be transportable to others in the series. Salamander are working on a version for the Oric which should be ready soon.

Robin Hamilton writes from Loughborough to ask if there are any versions of the original mainframe adventure for the Dragon 32. I haven't noticed any, Robin, but if any software manufacturers have been sufficiently interested to have ploughed through the column this far, maybe they would let me know of any plans they have in that direction.

To round off our Dragon column, I hope that Henry Lee will allow me to adapt his warning for the occasion: *Never anger a dragon, he might fume!* ■

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So, if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further, write to: Tony Bridge, Adventure Corner, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

EXPRESS DELIVERY - ORDER NOW

Please send me by return of post, Cassette 50 at £9.95 per tape. I enclose a cheque/postal order for £ made payable to Cascade Games.

Name

Address

Post Code

Country

Dealers & Stockists enquiries welcome

Please send me (tick appropriate box)

Spectrum ☐ VIC ☐

cascade

Cascade Games,
Suite 4, 1-3 Haywra Crescent,
Harrogate, N. Yorkshire, HG1 5BG.
England.
Telephone: (0423) 504526

NOISE FLOOR

Henry Cavey of Lime Crescent, Bishops Stortford, Essex, writes:

Q I like other people, I have had trouble with my ZX81 *Load/Save*. My father asked someone at work, who knows about these things, what might be wrong. And he said that the tape's noise floor might be low, or that the azimuth might not be at its best. My father did not really understand and neither did I. I know that azimuth is ■ do with the recording head in my tape recorder, but what is a floor of noise? Can you explain?

A Jargon strikes again! A frustrating and common disease, jargon can often cause more confusion than it saves. Still, a noise floor is a level of noise. It is not a phrase I have met before in computing. I think he simply means that the sound on the tape is not loud enough. It is generally taken that the output level of sound needs to be able to get up to 4.5v for successful *Load Save* — 3v, for example, would be insufficient as the noise floor would be too slow.

Azimuth is more commonly quoted when referring to this problem. It does, as you say, refer to the tape head. Specifically, the angle of the tape head to the tape. This, up to a point, can be adjusted on some tapes to give a more tinny sound. This is better for *Load/Save* on a ZX81.

FUNCTION KEYS

Paul Rogers of Grange Crescent, Tenterden, Kent, writes:

Q I would like to know something about the Vic20 function keys. How do I use them and can I use them all the time to do things like *Poke* or *Print*?

A I think, from your question, you would like to be able to use your function keys as soon as you switch on. This, I am afraid, you cannot do. As soon as the computer is turned off, any program is of course lost, whether it uses the function keys or not.

To use the function keys, you have to check the keyboard to see if a function key has been pressed. The most common way of doing this is to use the *Get* statement, where you check the value of the depressed key. You can do this because all the keys have a code, which you can compare with that of the function key to see if it was pressed. The odd numbered function keys have codes from 133 to 136, and the evens from 137 to 140. Try these three lines:

```
■ GET FK$: IF FK$ = ""THEN GOTO 10
20 IF FK$ <> CHR$(133) THEN GOTO 10
30 PRINT "YOU PRESSED FUNCTION KEY 1"
```

We can extend this to read more of the keys. Keep line 10 and enter the following:

```
20 IF FK$ < CHR$ (135) OR FK$ > CHR$ (138) GOTO 10
30 IF FK$ = CHR$ (135) THEN A = 5: GOTO 100
40 IF FK$ = CHR$ (136) THEN A = 6: GOTO 100
50 IF FK$ = CHR$ (137) THEN A = 2: GOTO 100
60 IF FK$ = CHR$ (138) THEN A = 4: GOTO 100
100 PRINT "YOU PRESSED FUNCTION KEY"; A
```

In this example, I have kept the four keys I used in a single routine. It is quite possible to use the *If/Then* format to take you to a whole suite of subroutines. Indeed, one way of thinking about the function keys is to see them as a one-key entry into a sub-routine.

There is another way of reading the keys and this is to *Peek* addresses 197 or 203. These read the key pressed and return a specific value. Thus *F1* and *F2* would return the same value. Every key can be used in this way, but when dealing with the function keys specifically, the values are as follows:

F1/F2	39
F3/F4	47
F5/F6	55
F7/F8	63
No Key	64

As for using the function keys to replace commands, I do not know of a way of doing this, other than by rewriting the keyboard scan so that it returns a different value for the keys you want to reallocate.

SOFTWARE WRITER

Mehermosh Master of the Computer Training Centre, London, writes:

Q I am a newcomer, not so much to computing, but to the UK. I have read your magazine and liked its content. I have a 48K Spectrum and have written many programs for it, both games and business (some good, some not so good). I would like to sell them to magazines and software houses. Could you tell me some useful addresses where I can sell these programs and how long an answer would take.

A At a conservative estimate, there are about 100 companies who would probably show interest in Spectrum software. There is no way I can name them all, but you could try companies like Silversoft, Quicksilva, Artic, or Imagine. For more serious types of program, Campbell, Hilderbay and Calpac.

As for magazines, the software generally comes in fits and starts. So there is a build up from March to Easter, that drops away during the summer, to pick up again later. You should look for an answer in about three and five weeks, but remember that it may take several months before the program is actually published.

Here are some guidelines:

(1) Always send a copy of the program on a good quality cassette tape.
(2) Always try and include a clear printout.
(3) Very important — always ensure that every item you send has your name and address on it, as well as the title of the program.
(4) If you want your material back, then also enclose an appropriate SAE.

Now to update a couple of previous answers. K H Bourke Burrows of Bibi Magnetics has written to add some extra information to the answer I gave to David Brown ■ the June 30 issue of *PCW*.

The International Electro-Technical Commission has not yet finalised a specification for computer grade cassettes, but the ECMA have decided on an international standard, ECMA-34. Tape must be as even as possible and unblemished, it must also be sufficient to retain the signals recorded on it faithfully. Cases should have thick pillars to hold the corner rollers, this helps cut torque, which of course causes wow and flutter. The other thing to look for is a strong large pressure pad to ensure even contact right across the playing head.

It boils down to the fact that just because a tape is C-10 this does not automatically make it of computer quality, though the smaller the tape size, the less the torque.

I have also had a letter from Miss Pam Fereday of Hove in Sussex, who writes to tell me of several computer and related indexes. The ones she mentions are:

Computer and Control Abstracts: A world-wide index that includes most of the monthly journals, such as: *Personal Computer World, Your Computer, Microcomputer Printout*, and so on.

Electrical and Electronics Abstracts: A sister publication to *CCA* dealing in electronics. Both publications contain indexes and abstracts.

Current Technology Index: Deals with mainly British journals in the field of technology generally. Eg: *New Scientist, Electronics Weekly*, etc. However, it does not include the popular computing magazines and it is only an index, no abstracts are provided.

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Ian Beardsmore and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke, PCW*, 12-13 Little Newport Street, London WC2R 3LD.

ULTRABASIC-64

Are you trying to write programs for your COMMODORE-64 using any of the following?

- high resolution graphics
- multicolour graphics
- sprite graphics
- sound effects
- joystick, game paddle or lightpen
- hard copy of graphics screen to Commodore or Epson printer

Well, if you want a package which makes it ultra-simple to use these features, then you need ULTRABASIC-64.

ULTRABASIC-64 adds 50 powerful commands to your COMMODORE 64. Commands for graphics and sound and sprites and games. No longer are you forced to use those hard-to-remember PEEKS and POKES. ULTRABASIC-64 removes many of the rough edges of using the built-in BASIC.

If that isn't enough ULTRABASIC-64 includes TURTLE-GRAPHICS commands which let you draw with a friendly turtle. Just position him on your screen and let him go. He is quite fast too.

The package comes complete with a 40+ page manual, an impressive demo program, and a two-part tutorial program.

Inclusive price: £19.95 cassette, £21.95 disk.

Dealer inquiries invited.

Send SAE for free catalogue of games and utility software for the C64.

ADAMSOFT (Dept. PCWK), 18 Norwich Avenue Rochdale, Lancs. OL11 5JZ

SHORT-LENGTH COMPUTER/AUDIO TAPES

If you have searched without success for high quality low cost short-length tapes then sit back and relax.

Premium Grade Agfa R F W Cassettes Manufacturers of high quality blank cassettes suitable for programming. For example, with a minimum order of 25, you can purchase 25 cassettes of 2½ minutes each side for only £10.00 plus postage & packing of £1.95. Fill in the coupon and post with your remittance to **R.F.W. Recording Supplies, Breese Acres, Northlands, Silsoe, Nr. Bedford, Lincolnshire MK22 0UA. Tel: 0525 750 595.**

All prices are inclusive of VAT at 15%

Please send me high quality audio tapes in the quantity indicated (tick where applicable)

25 cassettes	(including £1.95 p&p)
☐ 2½ mins	£11.95
☐ 5 mins	£12.20
☐ 6 mins	£12.45
☐ 7½ mins	£12.60
☐ 10 mins	£13.20
☐ 12½ mins	£13.95
50 cassettes	(including £2.48 p&p)
☐ 2½ mins	£22.75
☐ 5 mins	£22.95
☐ 6 mins	£23.49
☐ 7½ mins	£23.99
☐ 10 mins	£24.99
☐ 12½ mins	£26.49
100 cassettes	(including £3.50 p&p)
☐ 2½ mins	£43.50
☐ 5 mins	£44.50
☐ 6 mins	£45.50
☐ 7½ mins	£46.50
☐ 10 mins	£48.50
☐ 12½ mins	£53.50

including wiley card and side-labels

Total remittance £

NAME

ADDRESS

I enclose my cheque/PO

Please make cheque/PO payable: R.F.W.

MONSTER SOFTWARE CLUB

SOFTWARE LIBRARY FOR THE DRAGON 32

- ★ Software for hire from 11 manufacturers.
- ★ Over 90 titles to choose from, and growing.
- ★ TWO YEARS membership for only £8.
- ★ Same day service.

Send for details of FREE three months trial membership enclosing sae to:

32 Lennox Drive
Lupset Park, Wakefield WF2 8LU

VIDEO GALAXY

NO. 1 FOR HOME COMPUTERS AND SOFTWARE

Commodore 64	only £199.95
Dragon	only £164.95
VIC20	only £133.95
Spectrum	only £98.95
Spectrum 48K	only £127.95

100s of games, books and accessories available for popular home computers including BBC.

VIDEO GALAXY
293 CHISWICK HIGH ROAD
LONDON W4
TEL: 01-994 4947

TOOLKIT FOR DRAGON

ADD ELEVEN EXTRA COMMANDS TO BASIC

★ VARIFY ★ FIND ★ HIDE ★ FAST
★ MERGE ★ TEXT ★ REVEAL ★ OPTIMISE
★ AUTO ★ DUMP ★ SLOW **£8.95**

ARTIST FOR DRAGON

Many options to make graphics design simple:
Circle, Paint, Rectangle etc
JOYSTICK REQUIRED..... **£7.95**

£2 off Total Price for both top quality programs
Cheque/POs to:

STELL SOFTWARE
Freepost, Whalley, Blackburn, Lancs BB6 9DR

Irish Sinclair Owners

Softenk announces the arrival in the Irish branch of **Sinclair Owners' Software Library**

Hire ZX81/Spectrum tapes — many of the best currently advertised Arcade, Adventure, Simulation, Business, Home, etc — all with suppliers' permission.
Fortnights hire — £1.50 + 40p p/p. Hire what/when you like.

SOFTENK 120 South Circular Road, Dublin 8

Please send me on money-back approval my magazine, descriptive library catalogue and order form.

Name

Address

Please enclose cheque/PO for £9.50 (year's ZX81 membership)/£12.50 (spectrum)

ATTENTION **ATTENTION**

ATARI 400/800 OWNERS

MIDLAND GAMES LIBRARY

Do you want to join a long established library?
Are you looking for a fast efficient and friendly service?
Would you like to select from well over 400 cassettes, cartridges, discs and utilities?
Would you appreciate approximately 25 new additions per month?
Are you interested in interactive club schemes?
Before writing in the rest, try the BEST

ALSO, SPECIAL INTRODUCTORY OFFER

Various permutations where two games may be hired at once.

Send large SAE for details.

M.G.L.
48 Read Way, Bishops Cleeve, Cheltenham
(0242-67) 4960 6 pm—9 pm

All our games are originals with full documentation

POPULAR Computing WEEKLY Back Issues

Almost [illegible] PCW that you missed can still be bought as back issues for only 50p inc [illegible] postage and packing.

An index of the contents of the 36 issues published in 1982 is now available from the Publishers for only £1.20 p. It includes full details of all the programs, routines, reviews and news that you might have missed.

Please send me the following back issues at 50p each

Total £

Please send me a copy of the 1982 PCW Index at £1.20

I enclose a cheque/postal order for £

Name

Address

Please return to Back Issues, PCW, 12-13 Little Newport Street, London WC2R 3LD.

CLASSIFIED

Semi-display — £5 per single cc
Trade lineage — 20p per word
Private lineage — 10p per word

CALL *DIANE DAVIS* ON *01-734 2688* FOR SEMI-DISPLAY ADVERTISING

GAMES SOFTWARE

SPECTRUM PROGRAMS

Night Flite	£5.95
Heathrow	£7.95
3D Tunnel	£5.95
Escape	£4.95
Arcadian	£4.95
Gnasher	£4.95
Spec Vaders	£4.95
Maze Chase	£4.95

Many others. SAE for list
Prices including VAT and P&P
Cheques/POs crossed, payable to
VYALYS, H.K. 11 Margaret Avenue, Auston, Cornwall

SPECTRUM 16K. 'Raquel' presents her two for one game for age 16 and over only, state age when ordering, still only £2.95. I. Brooks, 17 Malvern, Coleman Street, Southend, Essex.

VIC20 GAMES: Robots, Crazy Balloons and Breakout for £1.50 each. R White, 51 Springfields, Welwyn Garden City, Herts.

EXCELLENT HORSE RACING FORECASTING PROGRAM for expanded ZX81, good program, the cheapest rate, on cassette for £2. (Also for ZX80, please state.) M McFagan, 48 Ballards Green, Burgh Heath, Tadworth, Surrey.

ADVENTURES, SPACE BATTLES, brain teasers for the Dragon 32 and Vic20 (unexpanded), tremendous hi-res multi-colour graphics (Vic20 user defined), original exciting games on cassette, five for the Dragon £5, four for the Vic20, £3.50, including P&P. Immediate despatch. PO to: A. Penrose, 20 Ponderosa, Eastmoore, Sutton-on-Forest, York YO6 1EX.

★ Q-MAN ★

3D Pyramid Game for BBC B. Avoid the snake and the ball.
Unique features – smart bombs and hyper space.
GREAT VALUE CASSETTE £3.95
M.R.M. SOFTWARE
17 Cross Coats Road, Grimsby, S. Humberside DN34 4QH

PROFESSIONAL BLACKJACK program tests, probabilities and card counting for a new inexpensive hobby. Spectrum 48K, £4.50. G. Houghton, 1 Lower Common, South Putney, SW15.

VIC20 SOFTWARE. Tarot, see into the future! £3.50. Simulation, a decision aid, £3.50. Data-file takes the place of any card index. Includes printout, £4.50. Textpro word processor many facilities, excellent program, £6.95. Data-file and textpro need +16K. All programs on cassette and fully documented. Fast delivery by first class mail. Send cheque/PO to: A. & C. Software, 51 Ashtree Road, Tindale, Warley, West Midlands B69 2HD.

WALL STREET CRASH, 12K Atom. Join your intelligent computer opponent trading on the stock exchange. Use the predictions and continually up-dated display to buy and sell shares; but avoid the crash! Only £2.50. Normal or 1200 Baud available. Cheques to P. Carter, 18 Links Drive, Christchurch, Dorset BH23 2RE.

ACE SOFTWARE. 3K GT1 Seven games £4. 19K, Hawkeye £6, Spaceshop £6, Mr. Peckish £6. Federation Software, 56 Rawley Crescent, New Duston, Northampton.

SINCLAIR PROGRAMS. For the ZX81, machine code Astro Dodge, £3.50 for the ZX Spectrum A large compendium, £3.50. Send 9p: D P Software, Mafod-y-Gan, Newton Road, North Petherton, Somerset.

DISCOUNT PROGRAMS
for Vic20 (Imagine) Arcadia, Bewitched, Catcha-Snatcha, Frantic, Wacky Waiter. Only £4.95 each, two for £9, three for £14, four for £17, five for £20. Cheques to: **Remcos Enterprises, 33 Victoria Road, Timperley, Cheshire.**

SORD M5
Gamestape 1 for the Sord CGL M5 with Basic 1 and joypads. Five quality games for only £5.95 including P&P. Cheques/POs to **FARNSOFT, Dept. PCW, 22 Great Austins, Farnham, Surrey GU9 8JQ.**

FOR THREE SPECTRUM GAMES from AFB Technology. Trone: try to trap the enemy light cycle. Starship One: try to blow up all the Krugs. Pilot: try to land without using too much fuel. On cassette. We are at 7 Carding Close, Coventry CV5 7BL. (Cheques to AFB Technology.)

SEVEN SPECTRUM GAMES, Snake, Death Duel, Space Panic, Kongs Revenge and more. Fast machine code, 48K Spectrum only. All for £3. Send to J. Williamson, 17 Oak Tree Close, Moreton Morrell, Warwickshire.

RUNESMITH
for BBC (32K) MICRO
Alter the story. Sci-fi, erotic, philosophical, or fill the gaps. Be comic with words, or feed in your own stuff. Send £9.50 cheque or PO for complete RUNESMITH package. **Abraxas Software, 13 Copthall Gardens, London NW7 2NG.**

Avalon Computing

A COMPREHENSIVE RANGE OF SOFTWARE TITLES: SPECTRUM 16K 48K, VIC20, DRAGON, ORIC, COMMODORE 64, BBC, ATARI 400/800

EG Jet Pack (Spectrum)	£5.49
Krazy Kong (Vic20)	£5.99
Zzoom (Spectrum)	£5.49
Dnc Chess Zodiac	(RRP £9.99) £8.49 (incl VAT)

Plus 100s more titles at competitive prices. Send a large SAE for catalogue. P&P 50p per order or free for two tapes.

AVALON COMPUTING, 14 CLIFF ROAD, HORNSEA, N. HUMBERSIDE HU18 1LL
Tel: 04012 2791

5D SOFTWARE ZX81(16K)

SPECIAL OFFER
4 Great original programs by various authors on one tape
- JAILBREAK
- DUSTMAN DAN
- A DAY AT THE RACES
- CONTRACTORS PAY CALCULATOR

ONLY £3.50
AVAILABLE NOW!

ORDERS TO
5D SOFT, HEMPLAND COTTAGE, N. LOPHAM, DISS, NORFOLK

T. WILMOTT presents program pack 1 for the standard TI99/4A consisting of 10 games including Adventure, Strategy and arcade-type programs. Supplied on cassette with instructions, £5. 3 Somerset Place, Somerset Bridge, Bridgwater, Somerset TA6 6LW.

ACTION GAME TAPES
ZX81 and Spectrum Programs
Call at:
Leigh House
97 Oakfield Road
London E17
Also Saturdays, rear of
32 High Road
Chadwell Heath
Essex
Free Gift if spent

★ LYNX OWNERS ★
AT LAST ARCADE ACTION FOR YOUR LYNX FROM:
SIAN SOFTWARE

Protector	£6.95
Icthyoids	£6.95
Racer	£5.95
Smashout	.95

Fast action, colour, sound and superb hi-res graphics. Must be seen to be believed. *Cheque/PO to*
S. Sian, 139 Roseberry Avenue, Manor Park, London E12

48K ORIC-1 SUPERFRUIT
Simulates a real fruit machine and features HOLD, two way NUDGE, GAMBLE or COLLECT WIN. Full colour GRAPHICS, SOUND and SKILL LEVELS.
PO/Cheque for £4.95 to
TOWERSOFT
3 Rudland Road, Bexleyheath, Kent DA7 5BD

CLASSIFIED ADVERTISING RATES:

Line by line: For private individuals, 10p per word, minimum 10 words.
For companies, traders, and all commercial bodies, 20p per word, minimum 20 words.

Semi-display: £5 per single column centimetre, minimum length 2 cm. (Please supply A.W. as PMT. Or supply rough setting instructions.)

Conditions: All copy for Classified section must be pre-paid. Cheques and postal orders should arrive at least two weeks before the publication date.

If you wish to discuss your ad, PLEASE RING Diane Davis 01-734 2688.

Here's my classified ad.

(Please write your copy in capital letters on the lines below.)

			Please continue on a separate sheet of paper

I make this ..... words, at ..... per word so I owe you £ .....

Name .....

Address .....

.....

.....

Telephone .....

Please cut out and send this form to: Classified Department, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

SPECTRUM SPECIALS

JET PAK	£5.50
AH DIDDUMS	£5.50
TRANZ AM	£5.50
ARCADIA	£5.50
TERROR DAKTIL	£6.95
PENETRATOR	£6.95
COOKIE	£5.50
3D TANK	£4.95

DISCOUNT OFFERS
BUY 2 AND GET 10 PER CENT OFF
BUY 5 AND GET 15 PER CENT OFF
POST AND PACKING FREE

PM SOFTWARE
24 TURNAVEAN ROAD
ST AUSTELL
CORNWALL

ZX81 16K OWNERS. Poolster is now available for your machine — the only pools forecast program based on six years' past scored draws permits highly individualised strategies, £9.99. Also available for the Sharp PC-1500/Tandy PC-2 +8K. State which machine. Cheque/PO to Nagram Software, Mail Order-PW, 18A Soho Square, London W1V 5FB. PS: Soon available for the Spectrum.

ZX81 (16K)

SUPER MENU DRIVEN GAMES

- MAZE CHALLENGE — 9 LEVELS OF PLAY
- HANGMAN — 2 PLAYERS
- ROAD RACE — VERY FAST
- PONTOON — FULL ACE TO KING GAME

On one tape, £3.50 including pool or Maze and Pontoon £2.25

Fast Order Service!

HQF SOFTWARE
14 NEWTON COURT
OUTWOOD, WAKEFIELD WF1 3QW

ZX SPECTRUM SOFTWARE

We are offering 10% off one or more tapes in a range of software for the ZX Spectrum.

Telephone or SAE for list.

We are also offering Jetpac, Pssst, Trans-am and Cookie by Ultimate, Play-the-game for £5 each inclusive of postage and packing!

RULE COMPUTERS
30 Tylers Acre Road, Corstorphine, Edinburgh, EH12 7HZ.
Tel: 031-334 7261

ORIGINAL SPECTRUM ARCADE GAMES. 48K, excellent graphics. Chopper Lift and Outlaws, £2.50 each or £4.50 the two. Cheque/PO to M J Smith, 141 Coombe Lane, Raynes Park, London SW20 0QY.

48K ORIC. Play the classic game, Reversi. Can you outwit Oric? The master. This is an addictive game, £3.50. A Gloughley, 101 Netherwood Tower, Motherwell, Scotland.

THEY CALL HIM CAPTAIN PHOENIX!

ZX81 (16K) SCRAMBLE. You've played the arcade version, now play ours, all 6 waves are included with Spacers, Fireballs, and Alien Bases. It's 100% m/c and only £4.40. Make cheque/PO payable to Base Two Software, 9 The Copse, Lindfield, Sussex. Programs will be sent by return of post.

YARTZI. Play this classic dice game on your 48K ZX Spectrum for £3.95. Send cheque/PO to: R Bartlett, 40 Frederick Road, Malvern, Worcester WR14 1RS.

FOR HIRE

TO HIRE A COMPUTER from ZX81 upwards, ring or write to Business and Computer Services, 292 Caledonian Road, London N1 1BA. Tel: 01-607 0157.

UTILITIES

TECHNICAL GRAPHICS DRAWING PROGRAM. 48K Spectrum. Horizontal, vertical, dotted or full lines. Isometric lines, isometric circles. Perspective with variable horizon. Specify different ink colours at any time. Print on screen at any position. Save screens, etc. Cheque/PO to J.W.A. Van-Lopik, Sunnycroft, Wrellon, Pickering, North Yorks.

ZX SPECTRUM. Mimic II tape copier. Backs up. Full 16/48K programs £2.25. D. Somen, 6 Asgbury Croft, High Meadows, Castle Bromwich, Birmingham.

BBC USERS. Save yourself hours use "Soft-keys". It sets function keys to provide 10 valuable facilities, also supplied template for key reference. Send cheque/PO for £2.95 to: A. J. Hawkins, 15 Godwin Road, Bromley, Kent.

SOFTSAVE FOR THE VIC20 is a 100 per cent machine code utility program which allows you to back up most software on to a new tape. Cassette with instructions, £4.95 from Softsave, 248 Evelyn Street, London SE8 5BZ.

SPECTRUM KOPYKAT

IMPROVED PERFORMANCE

Simply the best. Copying any program is now as easy as LOADing and SAVEing your own programs. **Any ZX Spectrum** program can be backed-up onto a fresh tape. Even programs that cannot be stopped can now be copied. 100 per cent machine code. Copies headerless files. Prints file name. SPECTRUM KOPYKAT uses no program area so **full size** programs **over** 41 **BK** (9K for 16K machines) are easily duplicated. PLUS **FREE** Header Reader program. **Immediate despatch by first class return of post.**

Send cheque/PO for £4.95 to

MEDSOFT
61 Ardene Road, Doncaster, DN2 5ER
IT CAN EVEN COPY ITSELF

AUTOKOPY COPIES any type of Spectrum tape (16-48K), even programs full 16K or 48K long, the best available, machine code, simple to use, full guarantee, £3. B. Tidd, 160 Howlands, Welwyn Garden City, Herts.

SPECTRUM 64 PRINT, amazing software that gives 64 characters per line instead of 32, prints anything from your Basic program, cassette, 48K or 16K, £2.90. K. Ahmed, 28 Magpie Hall Lane, Bromley, Kent.

TELETEXT ON YOUR SPECTRUM. Create your own 900-page teletext system with "ZXTEXT". Full colour, graphics, flashing, 24-hour clock, with alarm, free sample system, it's all here! Cassette £4.95. Iain Stewart, 17 Torry Drive, Alva, FK12 5NQ.

PEACE OF MIND FOR ORIC OWNERS! Add our VERIFY command to ORIC Basic. Check any tape file against memory. Works in slow and fast modes. Only £3.95 from: AWA, 50 Dundonald Road, Didsbury, Manchester.

SPECTRUM NOSEY, reads your tapes and prints out program name, length, start address and auto start line. Machine code and Basic, or send £3.95 for Nosey plus Copyall Kopykat. ZX-Guaranteed. 29 Chadderton Drive, Unsworth, Bury, Lancs.

DRAGON "KOPY-KEY". Copies machine code programs, send £1 (includes return postage) to: A. Ellis, 22 Tumavean Road, St Austell, Cornwall PL25 5NX.

SOFTWARE

CHAPMAN AND BECKINGHAM SOFTWARE
PRESENT FOR THE 16.48K ZX SPECTRUM
REVERSI £4.95 CUBE SIMULATOR £4.95 MATHS (5-10 yrs) £4.45
FOR THE 48K MODEL ADVENTURE ONE £4.45.
Send cheque/PO to: 12 Little Howe Close, Radley, Oxon OX14 3AJ.

ZX SOFTWARE — for our free catalogue of practical programs send sae to Dept P, SD Systems, PO Box 24, Hitchin, Herts. Prompt despatch.

DRAGON CRUNCHER
Fast cassette-based conversion program for Tandy Color programs to Dragon 32 and vice versa. Ideal for "Rainbow" readers. Only £7.95.
ELKAN ELECTRONICS, FREEPOST
Bury New Road,
Prestwich, Manchester M25 6LZ
Tel: 061-798 7613

"YOUR OWN SOFTWARE BUSINESS"
Start your own part time Home Based Software Business. Specially written Manual covers all you need to know including all Legal/Practical aspects. Advertising, Accounts, Sign Writers, Supplies, etc. etc.
Order Now! Send £3.99 to: T M B. (PC), 15 Clifton Rd., Prestwich, Manchester.

SEEN MY CAT? Post free Spectrum software from the two writers, independent assessments, FREE offers and more in my catalogue SOFTWARE (P), 20 Gordon Avenue, Bognor Regis, Sussex (02403) 822561.

SPECTRUM BASIC PROGRAMS made 100 per cent breakproof. £6. Send program on tape to A. H. Ibrahim, 54 Beresford Road, Longsight, Manchester M13 0QT.

VIC USERS. Low cost printing service for as little as £1. We can supply a quality hard copy of your program listing. Just send your program (16K maximum), with remittance to Ardensoft Productions, 25 St Nicholas Road, Henley in Arden, Solihull, West Midlands B95 5LL.

SEND YOUR COMPUTER LISTINGS to be saved on supplied tapes, programmes from magazines also saved, for any K Spectrum, Vic20, Texas TI, very cheap, quick. A Castell, 188 Brocklesmead, Harlow, Essex (0279) 416614.

SPECTRUM 16K/48K, "Raquel" presents her game for ages 16 and over only (state age when ordering), still only £2.95. I. Brooks, 17 Malvern, Coleman Street, Southend, Essex.

JONEL INDUSTRIES, computer and electronic repairs. Sinclair specialists. Send SAE to 25 Millord Close, Marshalwick, St Albans, Herts AL4 9BQ.

BBC "B" inexpensive quality program printout service. SAE details. Mr Small, 8 Cherrytree Road, Chinnor, Oxfordshire OX9 4QY.

VIC20 PRINTOUTS. Unexpanded, no graphics characters. Send tape SAE and £1 for listing by return to: Will O'Dwyer, "Glandon", Aber Gwynedd.

DEALERS

ROCHESTER SOFTWARE AND COMPUTER CENTRE

NOW OPEN AT
38 Delce Road
Rochester
Kent

FOR ALL COMPUTERS SOFTWARE AND PARAPHERNALIA

Tel: 0634 408305

SOFT MACHINE

A selection of the very best Software. Books and Accessories available for ZX81, Spectrum, BBC, Dragon, Vic20 and Commodore 64 Microcomputers.

3 Station Crescent
Westcombe Park
London SE3
Tel: 01-305 0521

or send SAE for free catalogue (state which computer)

CARVELLS OF RUGBY LTD
3/7 BANK STREET, RUGBY
Tel. 0788-65275

Vic20 Starter Pack Computer and C2N Tape unit, intro to Basic Pt1 and 4 games. Only **£134**, usually £139.95.

Atari 800 + software **£250.** 48K Ram + Basic — plus the best of the US software in stock.

We also stock BBC B, Electron, C64, Spectrum and software books. Phone or visit soon!

COMMODORE 64
£164 (excl. VAT)
Programmers Ref Manual £9.00 + £1.50 p&p
Tel: Chris Gunney, Dave Walsh or Floyd Patterson
Tel: 01-998 4858/7527 or send SAE
Imagic Science Micro Computers Ltd
199 Preston Road, London W10 6TH
or cheques PO (add 15% VAT) and £8 for p&p Securicor delivery
Prestel Frame 4820000 (a) for latest software and hardware information and prices. Full after-sales maintenance on all Commodore Equipment bought from us

MAGAZINES

TI99/4A

A MUST FOR ALL OWNERS
SUBSCRIBE TO QUARTERLY
TI-USER MAGAZINE
ALSO 99er MAGAZINE
FROM AMERICA MONTHLY
GALAXY, 60 HIGH STREET
MAIDSTONE, KENT
TEL: (0622) 679265

DRAGON USER

To make the most of your Dragon you need **Dragon User** – the independent magazine for Dragon owners. To make sure that you receive a copy of Dragon User regularly subscribe direct to us. A year's subscription costs £8 for 12 issues or subscribe for two years for £14.40 and receive a free copy of either **The Working Dragon** or **Dragon Gamesmaster** (overseas rates available on application). Send a cheque or postal order made payable to Dragon User, and accompanied by your name and address, to Dragon User Subscriptions Department, Oakfield House, Perrymount Road, Haywards Heath, Sussex RH16 3DH.

EDUCATIONAL SOFTWARE

LEARN FRENCH
WITH YOUR 48K SPECTRUM AND OUR
FRENCH VOCABULARY PROGRAM

- AUTOMATIC TESTS
- 600 PRE-PROGRAMMED WORDS
- ENTER AND SAVE YOUR OWN WORDS
- FULL ACCENTED CHARACTER SET
- IDEAL HOMEWORK AID
- PRINTS CRIB SHEET

ONLY £4.50 from
T.P.A. COMPUTER SERVICES
189 Upland Road, London SE22 0DG
Mail order only (or see for details)

EDUCATIONAL SOFTWARE for Spectrum 48K. GCE O CSE Physics, 6 programs, £6.50; Chemistry, 6 programs, £6.50, or both tapes, £12. Think Tank, Dept. PCW, 35 Wellington Road, Wimbledon Park, London SW19 8EQ.

At last!
Educational software developed and proven in schools

[illegible] 5 EXCELLENT PROGRAMS FOR 32K BBC

ALL PROGRAMS £7.50 EACH
Discount for schools and bulk ordering

Send for details to
MICRO sonsepi
23 Alumby Ave. GRIMSBY Humberside

BASIC MATHS

ZX SPECTRUM 16K 48K
ADDITION, SUBTRACTION
MULTIPLICATION AND DIVISION

Easily operated by an User friendly. Just follow the on-screen prompts. (Already used in schools.) And also to help you spell. £3.95 including P&P

HANGMAN FOR
ZX SPECTRUM 16K/48K
16K version has over 100 words
48K version has over 500 words
A game as old as words themselves. Both versions on one tape. £3.95 including P&P

Top Quality Blank Tapes. 10 + C12's £5 including P&P, as used by many top software houses. Trade enquiries welcome

Available from
OFFEYRE LTD.
740 SOUTHCHURCH ROAD
SOUTHEND-ON-SEA, ESSEX

DRAGON. Primary school arithmetic practice with instructions. £3. G. Reay, 74 Langholm Road, East Boldon, Tyne & Wear.

FOR SALE

COMMODORE 64 Addresspad and Catalogue Databases. Both taped. £6.50. K. Hutston, 14 Bispham Avenue, North Reddish, Stockport, Cheshire SK5 6NT.

VIC20 + C2N cassette, + 16K, 3K, 8K switchable. Jelly Monsters and Galacticans cartridges + six cassettes + introduction to Basic Part 1. One joystick, two paddles + over 20 magazines for £250. L. Roberts. Tel: 01-514 2609.

LYNX 48K. Still under guarantee, with monster nine cassette and Book. £160. Tel: (Crowborough) 08926 4551.

ZX81 16K. Good condition, with case, over 30 cassettes, worth £160, sell £100. Tel: Prestatyn 6260.

DRAGON 32 and software. Three weeks old, no faults. Will run at double speed. Sell £130 or swap for new 48K Spectrum. O'Donnell, 5 Worthington Close, Runcorn, Cheshire.

ATOM, 12K PLUS 12K. FL. Point, PSU, software, £85 ono. Tel. (0604) 720374 evenings.

ACORN ATOM 12 + 12K. F.P. books, lots of software. £100. Tel: Uxbridge (0895) 34996.

VIDEO GENIE COMPUTER, typewriter keyboard cassette recorder, 130 programs, all manuals, joystick. Would cost £550, will accept £195. Tel. Ware 4186.

JUPITER ACE, 3K plus book on Forth plus some software. £55 ono. Tel: 01-500 2358.

VIC20, Vic games and Alan for sale. For details telephone 01-640 7576.

ATARI VCS plus three carindges including Space Invaders with paddles, joysticks. Will sell for £65 ono. Tel: Epsom 21811 before 9 pm.

SELL OR SWAP, Atari VCS cartridges and Vic20 C2N cassette with 16K Ram for Vic 8K Ram, motherboard, games. Will split. 081-794 7905.

VIC20 + cassette + 16K + 3K super expander, joystick, dustcover, four books, four cartridges, and 14 well-known games, £275 ono. Tel. Gloucester 0452 502272, after 4.30 pm.

VIC20 REFERENCE GUIDE, £7; four-slot motherboard, £15; machine code monitor, £15. R. Dicken, 49 Hawkshead Road, Burtonwood, Warrington, Cheshire WA5 4PW.

FOR SALE: Mattel Intellivision, excellent condition, plus seven cartridges. £170. W. J. Martin, 6 Cage End Close, Hatfield Oak, Essex CM22 7HU. Tel: 0279 70467.

DRAGON 32, boxed plus ed mon, joysticks, magazines plus £100's software. £195 ono. Tel. 0633 51204.

VIC20 + C2N cassette recorder, 16K Ram, one Rom cartridge, £20-worth of software, introduction to Basic Part I, joystick. £160. Tel. Beaworthy 442 and ask for Richard after 6 pm.

DRAGON + £85 worth of software, joysticks, books, good condition. £210. Tel (0386) 830635 evenings.

ORIC 48K, lots of software and extra manual and carrying case. £130 worth, £220. Phone Weybridge 41869.

CASIO FX-700 P programmable calculator. Basic language program library, £35. Ring Steve on 01-207 4477 ext 161 daytime.

SPECTRUM 48K + 85 cassettes, recorder, two joysticks, loads of books, etc, worth £800; £300. 01-660 2160 (Croydon).

WANTED

WANTED. Instructions for oscilliscope type. Telequipment ServisCope Minor. Please write to: Mr T. D. Parsons, 42 Parkleys, Harlington, Dunstable, Beds LU5 6LZ or telephone: 052-552275.

WANTED: VIC20 SOFTWARE. Jackpot, Moons of Jupiter and more to swap. Tel: Eddie (0442) 833820 after 5 pm.

WANTED
Quality Games and utility programs for any Micro programs considered.
Instant cash plus royalties, on all programs accepted with a view to distribution in UK, USA and Europe
Dream Software PO Box 64
Basingstoke, Hants RG21 2AB
Tel: Basingstoke (0256) 26107

SUNSHINE

Is seeking authors for new titles to add to its highly original and successful book range. Experienced and first time authors are invited to submit manuscripts, ideas or fields of interest. Full details of what we can offer from **David Lawrence, Book Editor, Sunshine, 12-13 Little Newport Street, London WC2R 3LD.**

Sunshine. Publishers of Popular Computing and Dragon User

MATTEL INTELLIVISION plus 20 cartridges, including Chess, Demon Attack, Lock'n Chase, £300 ono. Tel: 01-203 1104.

VIC SOFTWARE WANTED — Maplin, Romik, Sumlock, and American cartridges, or anything new. Tel: Jim, 0532 589465.

WANTED: TI-99/4A JOYSTICK, will pay £10. Also Spectrum software, book to sell or swap. Tel: Hornchurch 57487.

CLUBS

SOFTWARE CITY
SOFTWARE CLUB
Massive list of games, tapes and discount card
For Spectrum, Dragon, Vic20, BBC, Sharp, Apple
TRY BEFORE YOU BUY
SAE FOR LIST
18 THEOBALD STREET
BOREHAMWOOD, HERTS

COMPUTER SWAP

Computer Swap entries are limited to 30 words. Either fill in the accompanying form and send it to Computer Swap, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD or telephone 01-734 3454.

All software offered through computer swap must be in original condition and for private sale only.

Warning: It is illegal to advertise pirated software.

COMPUTER SWAP

Please write your copy in capital letters on the lines below.

Name.....

Address.....

.....

Telephone.....

SOFTWARE EXCHANGE. Swap your used software via our club. Free membership. £1 per swap. Most computers SAE for details. UKSEC, 15 Turnwell Greave, Sheffield S5 9GB

HARDWARE

PROM SERVICES
ZX hardware specialists
micro system design and development
NEW products for ZX micros: –
3 output analogue converter £27
8 input analogue receivers in three ranges of resolution with or without I/O control lines ... from £23.95
I/O cards – three types available 24 or 32 lines with or without LED indicators. A/D or D/A facilities from £14.50
Still available – a range of EPROM boards and EPROM software
NEW EPROMS now in stock – SAE for details
Motherboards, audio and graphics generators autostarts, clocks and counters. Edge cards 75p Edge connectors £2.50p Ribbon cable 75p/P&P
EPROM SERVICES
3 Wedgewood Drive, Leeds LS8 1EF
(0532) 667183 326 6

ACCESSORIES

BROKEN JOYSTICK?
STRONG I R joystick insert replacements supplied with full fitting instructions. 1 YEAR GUARANTEE.
£2.30p(all inc p&p)
SOFTWARE FOR ATARI (TM) 400/800
All cassettes under £ send s.a.e. for lists
Computer Supplies (PCW8)
146 Church Road
Seaton, Lincs PE12 8JX

FLOPPIES, cassettes, paper, ribbons, labels, ICs, bits etc. SAE for prices. Dept MO, MMS, Poplar Road, Cleethorpes DN35 8BD

DO YOU USE COMPUTER STATIONERY? Then don't buy more than you need. We will provide as little or as much as you require. Listing paper, labels, etc, etc. HCL, 19 Greenland Road, Kemsing, Sevenoaks, Kent. Tel: Orford 2918.

BUSINESS SOFTWARE

PHOENIX SOFTWARE

Are looking for Machine-Code Arcade-quality games. We have an idea which could make your game the best seller in Europe.

Send your program to

PHOENIX SOFTWARE
Spangles House
116 Marsh Road
Pinner, Middx.
or Tel:

01-868 3353

NOW!!!

EXCHANGE

software exchange centre
[illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]

For more details
Tel (0293) 544327 at all times

SWAP SPECTRUM PROGRAMS. I have lots Tel 061-303 4919, Garth after 6.30 pm.

BBC (B) SPECTRUM SWAPSHOP. Send now for "Free" membership (or details) to: Mr M. A. Paris (Swapshop), 38 Wooburn Manor Park, Wooburn Green, High Wycombe, Bucks Stating micro

SHARP GF575 stereo radio, twin cassette. Dolby (£220) for 48K Spectrum plus cash/accessories or £149 ono Brookwood 3702, Surrey

SWAP HOBBIT (or other Spectrum software) for Scrabble Tel: Robert (0234) 768480 (after 7 pm)

SWAP FOUR DRAGON GAMES CASSETTES (originals) for any cartridge Phone 01-821 1710 after 9 pm

ACCESSORIES

COMPUTER CARRYING CASE
Suitable for Spectrum One Lynx etc hard case (black) 13" × 8" × 3"
Separate pockets for leads power pack etc Fields flat for storage. £12.95 including VAT p&p £2
Dealer enquiries welcome
SHERBORNE DESIGNS
Victory House, 8a The Rank
N. Bradley, Trowbridge, Wilts.
Tel: 02214 4425

PROGRAMMERS

SD SOFTWARE
Program Writers Co-operative
Hempland Cottage nr Lyngham
Dyke, Norfolk

- **PROGRAMMERS.** Our Author-Members not only receive 70% of income from their published software, also there are many other benefits in joining us. Send us a copy of your latest work and tell us about yourself. (Any Popular Micro) Copyrights fully respected.
- **MICRO-OWNERS.** We write and distribute good quality, original software at sensible prices, not expensive psychedelic packaging. Why not send for our lists. (Give details of your system)

TYPEWRITERS

EX DEMO ATARI 800 (48K) including Basic, Program Recorder, Joysticks and Thermal Printers, together with 21 cassettes and eight cartridges (mostly games). Cost new £1,300, special one-off price **£599** for quick sale. *Contact Kobra Micro Marketing. Tel: Henley-on-Thames 2512.*

Atari Small Business Software Suite. Comprising Videalc, Atari Word Processor – Mailing List Manager and Home Filing System, requires 810 disk drive. New and unused, normal price **£295** — special offer one only complete suite **£140.** Contact **Kobra Micro Marketing. Tel: Henley-on-Thames 2512.**

Computer Swap 01-734 3454

Free readers entries to buy or sell a computer. Ring 01-734 3454 and give us the details.

ZX81s for sale

ZX81, 16K, plus keyboard, four tapes, two books and magazines, will sell for £80 Tel Birtley 4106576.

ZX81, complete with power pack leads, manual, in box, as new. £30 Write to Mr Salter, Samhield Road Belfast BT8 4AF

ZX81, 16K + £55-worth software + 2 books. £55 Tel: (78) 29376

ZX81, 16K, 4K Graphics Rom, encased in DK'tronics keyboard plus numeric pad, joystick, interface + £100 software, £80 ono. Tel: High Wycombe 713899 (after 5 pm).

ZX81 (SINCLAIR) + Sinclair 16K Ram + printer, all boxed, good as new with manual, £70 Tel: Dorking (0306) 880806 (after 6 pm)

ZX81 16K + DK Tronics, full K graphics Rom 2K of user defined graphics, full-size cased keyboard on off save load switches + joystick port with one joystick, inverse video switch + two books/magazines/12 cassettes. £100 Tel. Titchfield 45915.

16K ZX81 + character generator + software and proper keyboard. £40 Tel 01-701 8007 (Kann Kamara)

ZX81 16K with leads, manual power supply. Several books and some tapes. £45 Tel (0453) 882776

16K ZX81, eight months old, with keyboard + two books and over £100 software. £120 ono Tel Ripley (0773) 42759

ZX80 8K Ram (4K Rom), 16K Ram, £20 Tel: Brighton 415778.

ZX81 PERSONAL COMPUTER (eight months guarantee), around £25 Tel: Andrew Marshal on Weston-super-Mare 412865

ZX81 16K + all leads + four months old – many games and books. £60 ono Tel 522 5359

ZX81 16K + all leads and manual + many listings over £180 worth of software including Mazogs, Flight Simulation, and Pimamania, cost new over £250, sell for £500 ono Tel 021 449 0684

16K ZX81 + £80 worth of software, £30 Tel: Bracknell 25636

ZX81 16K, 24 tapes, four books including machine code, worth £180, sell for £110 Tel: 01-995 6018 (after 5 pm).

ZX81 16K + £35-worth of software with magazines, PSU and leads, all very good condition, programs include Vu-File and chess. Will sell for £45 ono Tel 01-737 2411 (after 6 pm)

ZX81 WITH 16K RAM PACK, Sinclair built, books and plenty software, still boxed, £45 ono Tel: 360 2156.

ZX81 – 16K Ram pack, under guarantee + software, lead, manual + £40-worth software, £20-worth magazines, all for £50 Write 35 North View Avenue, Biddiford, North Devon

ZX81 16K – good software + magazines, books, very good condition, only £78. Tel Nelton, Denham 832678.

16K ZX81 with a Cayde keyboard + 3 channel sound board – £50 worth of software, sell for £70 Tel: 095 582209

ZX81 16K + £65 worth of software + 2 books. £55 Tel: 7829376 (Epsom)

ZX81 16K, 4K Graphic Rom, inside case Keyboard, books – magazines, leads + PSU £60 ono. Warrington 65380 (6 pm)

ZX81 16K – Fuller keyboard – games, £60 ono Tel. Bracklon 781123.

ZX81 16K + 11 software tapes including Mazogs, Gulp, ZX Chess 2, 3D Monster Maze and whole set of quizzes + all accessories, with books worth £30. Any offer considered Tel: 361 0930

ZX81 16K includes all leads, manual etc, plus games, software, two additional manuals, magazines, £40 Tel: Leconsfield (0401) 51255

ZX81 16KR, DK Tronics keyboard, case, motherboard, numeric pad, magazines, books + software, £80 Tel. 0494 716590.

ZX81 fitted with the DK Tronics graphic Rom board, ZONX sound pack with moving keyboard, around 50 magazines, 2 books, around £60 worth software + TROM 14 inch black white TV with aerial in mint condition, must sell at £1 210 Tel 01-998 8117 (evenings — ANOOSH)

SUPERB ZX81 SYSTEM with 16K Ram, cased Daans professional keyboard, A/D board, loads commercial software, cost £200+, genuine bargain £95 D Heath, Bagley Close, Kennington Oxford Tel. (0865) 735936 with manuals leads etc

Spectrums for sale

SPECTRUM SOFTWARE to swap 48K and 16K wanted Horace and the Spider Horace goes Skiing, Penetrator Tel 0772 744439, ask for Steven

SWAP ZX SPECTRUM MANUAL and introductory booklet for any Spectrum software hardware, books or magazines Tel (0685) 841 581

48K SPECTRUM — six months old — £100 Tel 01-573 2196

ZX SPECTRUM — 48K with £160 software, worth £290, sell for £180 ono or exchange for BBC A/B with cash adjustment! Tel Colchester 250987

48K ZX SPECTRUM and book, £99.90 Tel 061 9821834

SWAP SPECTRUM 16K or 48K software (Hounslow area) Ring 01-843 0526

SWAP SPECTRUM 48K, 10 months, 10 tapes, 82 magazines, worth £235 For CBM 64 + accessories or £185 ono. Can't collect. Tel. 051-733 0090 (4 pm)

SPECTRUM 48K, 3 months old, with Fergusson recorder + Flight Simulator, Armageddon, still boxed. Sell for £140. Tel (0970) 617582

Acorns for sale

BBC MICRO MODEL B 32K. Very good condition plus all leads and joystick, magazines and other manuals plus over £160 worth of software, including Scramble and Defender, £499 Tel Andrew, 01-340 8836.

BBC MODEL A, 32K. All offers considered for this excellent package including monitor, cassette recorder, software, books, etc. All as new, worth £550 Tel: John, 08675 5880, evenings

ACORN ATOM HOME COMPUTER, 12K Ram, 12K Rom and Ross toolkit Rom £120 Tel: Lowestoft 514908.

BBC MICRO A plus cassette recorder, leads and magazines. £220 Tel. 01-657 5556

BBC MODEL B, seven months old plus leads, booklet, etc, dust cover, £20 worth of software. £350. Tel: St Albans 50294

Ataris for sale

SWAP MY ATARI VCS with Space Invaders, Combat + Astrowars, for a 32K Rampack and about seven software tapes, for the Spectrum Tel: Aston Abbotts 8130.

ATARI 400, 32K Ram + basic, + program recorder, + 100 programs. Offers Tel: 01-200 7028

ATARI VIDEO GAME + ■ cartridges, £50. Tel: 01-274 7167.

ATARI 400 16K, program recorder, Basic cartridge, manual and Energy Czar cassette, £140. Call 01-734 3748 evenings.

ATARI 800 48K, basic cartridge, 810 disc drive + manual + joystick + 2 disc software + one cartridge game, unwanted gift, brand new, one year guarantee, quick sale, £499 ovno. Tel. 864 5613.

ATARI with 10 cartridges, good condition, £150. Tel: 455 1042

ATARI 400 16K + Basic hand books and cartridge + Atari cassette recorder + Pointmaster joystick + several magazines + Airstrike + many other cassette, basic software, make an offer. Tel: 07048 75922 (weekdays 4.30 pm to 6.00 pm)

ATARI 400 48K including Basic manuals/410 recorder and joystick. Also £400-worth of latest software including Donkey Kong, Qix, Miner 2049er, £225 ono. Buyer collects. Tel: 0908 75094

ATARI GAMES FOR SALE including Preppie 2, £10; Miner 2049er, £15; Apocalypse, £5; private sale. Tel Poole 686423.

ATARI 400 with 32K Ram + Basic language + 89 programs, bargain at only £160. Tel. 01-200 7028

VIC20 + cassette recorder, games tape, cartridge, books, £140 ono: Epson MX80FT printer, £300 ono; disk drive, teak case, power, £270 ono. C Lawson, 3 Rosaburn Gardens, Edinburgh (tel: 031,337 1656, day or evening).

ATARI VCS plus five cartridges. Perfect condition. Delivered anywhere in UK, £100. Tel. David, 0365 81675.

ATARI VCS for sale, £400. Tel: Simon, 500 3532 from 4 pm to 8 pm

ATARI 400 16K Ram plus Atari 410 program recorder plus various cartridges including Basic cartridge plus manuals plus two joysticks, £150. Tel: 01-435 7336 anytime

ATARI 400 16K. Brand new, never used. Full guarantee, £180. Free software including Centipede, Star Raiders, Frogger, Airstrike and others. Sell for £140 ono. Tel. Southport (0704) 28233 after 6 pm

ATARI VCS plus six cartridges, Asteroids, Breakout, Combat, Missile Command, PacMan, Space Invaders. Good condition includes four joysticks and two paddles. £75 ono

Dragons for sale

DRAGON 32 + 3 cartridges, joystick, word processor (Telewriter), manuals/leads/books, good condition, £180 ono. Tel. 01-903 4311 (evenings and weekends).

DRAGON32 + software, as new, still boxed, £120 ono. Tel: Dave on Luton (0582) 65494

DRAGON 32, in excellent condition, complete with manuals, leads, joystick, magazines and lots of software. Total value £1,250. Offers. Tel: Leeds (0532) 687964.

DRAGON 32 plus carry case and cassette recorder, plus three cartridges and 100 games including The King, Ninja Warrior, Android Attack and joystick, £215 ono. Tel: 061-652 5854.

DRAGON 32. Lots of software, books, joysticks. Atari 1800. Brand new, boxed, manual cassette, wanted ■ swap to BBC Model B in good condition, cassette and demostration program. Tel. Gravesend 84608.

DRAGON 32, two weeks old and £40 software, no faults, genuine reason for sale. Sell for £140. Call or write, 5 Worthington Close, Palacefields, Runcorn, Cheshire.

DRAGON 32 + tape recorder, virtually brand new, £155. Tel: 689 7358.

DRAGON 32 + joysticks, little used and under warranty, books, manuals and well over £130 of good software, £163. Tel. Halifax (Yorks) 0422 65009.

DRAGON 32, boxed as new, with £80 software, joysticks, dust cover, tapes, all copies *Dragon User*, machine and utility books, many magazine articles + listing, £160. Tel Stevenage (0438) 60537

Tandys for sale

TRS 80, Model 3, 48K + internal monitor and disc drives (2 x 40 track), about 20 discs + much software, sell for £975 ono, cost price (November 1982) £1,800+. Tel: 01-572 2917

TANDY COLOUR 16K COMPUTER, matching CC R81 + cassette recorder + 2 joysticks + Ram cartridge games including Missile Command + tape games + manuals/magazines. 8 months old, valued at £420, bargain at £290 ono. Tel: Brownhills 371245

Commodores for sale

VIC20 and cassette unit, £110. Commodore 8K expansion, £16, or £125 the lot, four months old, under guarantee. Also various software from £4. Tel: 061-439 2982 (ask for Tim).

VIC20 + C2N tape recorder. Commodore 16K Ram cartridge + programmers reference guide, two joysticks + Introduction to Basic, part 1 + software (six months guarantee), swap for 48K Oric + compatible TV. Tel. Brighton 415778.

VIC20 + C2N2 cassette deck + 16K Ram + seven cartridge type games + joystick, £150. Tel: Harlow 417818 (after 6 pm)

CASSETTE DECK for Vic20 plus £250 software — for £80 — call 01-455 2651.

VIC20 plus C2N plus Vic printer, 8K and 16K Ram pack, books including Vic Revealed and Reference Guide. Software including Spiders of Mars, Meteorite, various other games plus super expander and programmers aid, O level packages plus magazines and joystick worth £830. Will sell for £500 ono. Tel. 01-848 4000

VIC20 C2N cassette deck, 8K Ram, joystick, books, mags, over £100 of software — sell for £200 ono. Clacton 431243

DISC DRIVE for Commodore, Vic20 or 64, good condition, £170 ono. Tel. Leeds (0532) 742450.

VIC20 + C2N cassette deck + 12 cartridges + 30 original cassettes + joystick, £330 (may split). Tel. 031 661 7477.

VIC20 SOFTWARE to sell or swap, Vic20 manual, Vic joystick, cassette unit with lead for BBC (brand new), £18, *Personal Computer News* issues 1 to 25, only £10. Tel: 01-460 3171 any time

Wanted

WANTED. Kempston or Quickshot joystick for Spectrum. Lowest price up to £13. Tel: Brookwood 81117.

WANTED. 48K Spectrum, in good condition, with/without software for under £90. Tel: 590 8301

WANTED. BBC Model A or B in good condition. Tel: Canterbury (0227) 58529

WANTED. Second-hand Atari disk-drive. Tel. 0990 21160.

WANTED. Sinclair Spectrum 16K or 48K. Must be in working condition. All offers considered. Tel: 01-574 4122.

WANTED. Basic ZX80 or ZX81. Tel: Southend 335915.

WANTED. An old type 410 Atari tape recorder. Tel. 907 1582

WANTED: COMMODORE 3040 OR 4040 DISC UNIT. Tel: 01-992 6249.

For sale

ZX81 - 16K Kayde keyboard, books + magazines, software, excellent condition. Could not buy the same new for £125. Quick sale, £65 ono. Tel: Andover (0264) 4528

PRINTER, EPSON MX70, as new, £200, also TRS80 LII 16K with cassettes and VDU. Offers. Phone D. Fitzgerald (0635) 49044.

SPECTRUM 16K with leads, 29 magazines, 2 books, box, £85 worth of games and over nine months guarantee for only £180. Tel. Sunbury 82916.

DRAGON SOFTWARE, Android Attack, Vultures (Galaxian), Defence, Planet Invasion, £5 each, Dragon Trek, £7. Tel (0344) 53541 evenings.

SPECTRUM 64 PRINT, amazing software that gives 64 characters per line instead of 32, prints anything from your Basic program, cassette, 48K or 16K, £2.90. K Ahmed, 28 Magpie Hall Lane, Bromley, Kent

ATARI "CLONEKING" copies, all protected cassettes, machine code or Basic easily, fully guaranteed. £4.95. To R L B 54 Castle Drive, Fort William, Invernesshire, Scotland

TELETEXT ON YOUR SPECTRUM: Create your own 900-page Teletext system with "ZXtext". Full colour graphics, flashing, 24-hour clock with alarm, free sample system — it's all here! Cassette £4.95. Iain Stewart, 17 Torry Drive, Alva FK12 5NQ

AUTO KOPY COPIES any type of Spectrum tape (16,48K), even programs full 16K or 48K long, the best available, machine code, simple to use, full guarantee. £3. B Tidd, 160 Howlands, Welwyn Garden City, Herts

SOFTSAVE for the Vic20 is a 100 per cent machine code utility program which allows you to back-up most software onto a new tape. Cassette with instructions. £4.95 from Softsave, 248 Evelyn Street, London, SE8 5BZ

SEEN MY CAT? Post free Spectrum software from the two writers, independent assessment. FREE offers and more in my catalogue. SOFTWARE (P), 20 Gordon Avenue, Bognor Regis, Sussex (02403) 822561.

DIET AND WEIGHT CONTROL for 48K Spectrum, revolutionary, simple and effective. £4. Dr E. Frangoulis, 54 Holland Road, London W14

SPECTRUM BASIC PROGRAMS made 100 per cent breakproof. £6. Send program on tape to A. H. Ibrahim, 54 Beresford Road, Longsight, Manchester M13 0QT

ATARI VIDEO GAME with 5 cartridges. £70 ono. Tel 328 2075 (Private sale)

1800 US DOLLAR SONY CRF1, communication receiver, latest and best, will swap for best computer most preferables offered or money. Tel: 0269-850578 (David)

ADVENTURE HELPLINE

Micro *Vic20*
Adventure *The Count*
Problem *(1) Open the Coffin. (2) Stop Dracula robbing you of your tent stake. (3) What use is the oven?*
Name *M. Valentine*
Address *101A Underdale Road, Shrewsbury, Shropshire*

Micro *Spectrum 48K*
Adventure *The Hobbit*
Problem *Where is the bow and how do you kill the monstrous dragon flying after you?*
Name *Robert Tench*
Address *32 Anglian Way, Market Rasen, Lincs*

Micro *BBC Model B*
Adventure *Philosopher's Quest*
Problem *I cannot get out of the ME passages after finding the portrait of Escher*
Name *Andrew Hunt*
Address *39 Roedich Drive, Taverham, Norwich NR8 6RA*

Micro *Vic20*
Adventure *Pirate's Cove (Commodore)*
Problem *I need to know how to open the treasure chest which is found on Pirate's Island*
Name *D. Hughes*
Address *13 Pittfield Gadens, Baguley, Wythenshawe, Manchester M23 8EA*

Micro *ZX Spectrum 48K*
Adventure *The Hobbit*
Problem *Upon reaching the elvish clearing I become stuck. I have with me Thorin, a sword, rope, large key, map and a ring*
Name *Nicolas Pinnell*
Address *Penthos, Green Lane, Churt, Farnham, Surrey*

Micro *BBC B*
Adventure *Castle of Riddles*
Problem *The happy little bears and the horrible blood sucking creature seem impassable and waving the rod in the dark passages merely produces coloured smoke. Where do I go from there?*
Name *P. J. Ambrose*
Address *91 Dene Way, Newbury RG13 2JN*

FRIENDLY SOFTWARE HIRE

NEW

JOIN OUR NEW LIBRARY FOR: SPECTRUM:

GAMES: TAPES:
BUSINESS: TAPES:
EDUCATIONAL: TAPES:
GRAPHIC:
HOME UTILITIES:

Hire as many tapes as you like, all hired with manufacturer's permission, royalties paid. Reasonable hire fee, library subscription just **£8.00** per year, **£2.00** extra overseas

SPECIAL OPENING OFFER UNTIL END OF AUGUST, 1983. JUST £5.00 FIRST YEAR

(30 days money back guarantee)

SPECTRUM: Coming soon, library for Dragon, BBC, Commodore. Write, tell us which computer you have, which cassettes you would be interested in.

Send your subscription to:

FRIENDLY SOFTWARE HIRE
27 CONIFER CLOSE, WHITEHILL, BURDON, HANTS GU35 9DH

STAR SOCCER

The ACTION game with the thrills of real football

Make the split second decisions that the professionals have to!

Side 1 features a SUPER LEAGUE competition between 8 top British sides.

Side 2 replays the WORLD CUP finals.

It's amazing how so much is packed into 16K!

Available for ZX Spectrum and ZX81

ONLY £5.95

Watson Software Services Ltd (Dept. F1)

1, Ivy Cottages, Long Road West, Dedham, Essex CO7 6EL

YAHTCEE

YAHTCEE . . . This traditional dice is for one or more players and features superb graphics to enhance your enjoyment YAHTCEE is Fascinating, Absorbing and Challenging

SPECIAL OFFER

Order YAHTCEE today for only £7.95 incl. and get a 10-game cassette FREE

ANIK

30 KINGSCROFT COURT
BELLING, NORTHAMPTON

TICK BOX FOR YOUR REQUIREMENT
COM 64 | SPECTRUM 48 | DRAGON 32
YAHTCEE
NAME
ADDRESS
ENCLOSED TOTAL SUM

GAMES CENTRE

THE LARGEST SELECTION OF GAMES IN THE WORLD

We stock the **BIG NAMES** in Computers including

ATARI 400/800
SINCLAIR ZX 81
ZX SPECTRUM

and a wide range of independent **SOFTWARE**

Main Computer Branches:
OXFORD STREET, London W.1.
439 OXFORD STREET, London W.1.
52 WESTERN ROAD, BRIGHTON.
31 LISTER GATE, NOTTINGHAM
141 NEW STREET, BIRMINGHAM
60 COMMERCIAL ROAD, Bournemouth

Also at:
184 REGENT STREET, London W.1.
254 REGENT STREET, London W.1.

ASTROLOGY

truly AVAILABLE AT YOUR FINGERTIPS

USER PROMPTING PROGRAMS: merely key in birth information as requested by the computer — READ OUT (and/or PRINT OUT) what is normally the result of many hours of painstakingly tedious and complex mathematical calculations using tables, ephemera, etc.

THE SIDEREAL TIME OF BIRTH.
THE ASCENDANT AND MIDHEAVEN in Sign, Degrees, Minutes and Seconds for EQUAL HOUSE SYSTEM.
THE SIGNS AND POSITIONS OF THE HOUSE CUSPS in Sign, Degrees, and Minutes for the PLACIDEAN SYSTEM.
THE SUN AND MOON POSITIONS in Sign, Degrees, Minutes and Seconds.
ALL THE PLANETS' POSITIONS in Sign, Degrees and Minutes.
THE LUNAR NODE — THE PART OF FORTUNE — THE VERTEX AND A HOST OF OTHER BIRTHCHART INFORMATION AT THE TOUCH OF A KEY.

ZX81 16K

ZODIAC I — ONLY £10.00
ZODIAC II — ONLY £8.00
GIVES YOU THE ASPECTS AND MIDPOINTS

FOR 48K SPECTRUM AND DRAGON 32

ZODIAC F
Full combined program on one cassette

FOR ONLY **£15.00**

Other programs in course of preparation include: PROGRESSING THE HOROSCOPE; RECTIFICATION OF THE BIRTH TIME, etc.

Send orders with cheque payable to:

STELLAR SERVICES
8 FIR TREE VALE, LEEDS LS17 7EY
Tel: (0532) 692770

CURSES

Snoopy fans will be more than familiar with the Red Baron — the German World War I flying ace.

Terminal Software now gives you the chance to emulate the Red Baron's legendary feats in *Super Dogfight* — a two-player game for the Commodore 64. Based on the original arcade game, *Super Dogfight* is written in machine code and offers sprite graphics, colour and sound, and full screen wrap-around for uninterrupted play.

Curse you, Red Baron.

Program	*Super Dogfight*
Price	*£9.95*
Micro	*Commodore 64*
Supplier	*Terminal Software*
	28 Church Lane
	Prestwich
	Manchester M25 5AJ

BLACK HOLE

The Newbrain is one of those machines that has what media people call a low profile. Although intended for fairly serious home users (and lacking colour), a number of software houses brought out games packages for the machine, before news of Grundy's collapse was announced last month (*PCW* 23-31 August).

Grundy Business Systems produced software for both camps: ie, games and utilities. Most of the games are in packs of two which, providing that both are of good quality, is a nice idea.

Quadrax/Space Battle gives you a sort of complicated noughts and crosses with a shoot-'em-up space game. *Quadrax* requires you to beat the computer to a straight line of a chosen number on a grid — *Space Battle* is a two-player game, each trying to destroy all of the other's ships without flying into a Black Hole.

Program	*Quadrax/Space Battle*
Price	*£9.95*
Micro	*Newbrain*
Supplier	*Grundy Business Systems*
	Cambridge Science Park
	Milton Road
	Cambridge CB4 4BH

EDITOR

For those who need to store information and perform simple processing operations, without going to the expense of a fully-fledged word-processor like *Tasword*, there is *Pagepro*.

Pagepro allows you to set up pages of information and, to a limited extent, edit it. Other facilities include copying to a printer and *Load/Save* of all information.

Program	*Pagepro System*
Price	*£5.95*
Micro	*Spectrum 48K*
Supplier	*SD Micro Systems*
	PO Box 24
	Hitchin
	Herts SG4 0AE

SOUPED-UP

Ants may not strike you as particularly fearsome creatures, but those found in Macronics' *Ant Attack* are different from the common or garden kind.

Basically, *Ant Attack* is a kind of souped-up caterpillar — souped-up because of the various other animals that turn up to help the ants in their attack.

A feature on this game that could easily become a must on other games is voice control. Assuming you have the correct kind of cassette player, you can operate the fire control simply by speaking into a microphone!

Presumably, this idea could be extended to all the controls, provided the Spectrum could be relied upon to distinguish between the sounds, and providing actually saying the word doesn't take too long for the kind of fast action response arcade games require.

Program	*Ant Attack*
Price	*£4.95*
Micro	*Spectrum*
Supplier	*Macronics Systems*
	26 Spiers Close
	Knowle
	Solihull
	West Midlands B93 9ES

SLEIGH RIDE

Geordie software company Byteware is now producing games and educational programs for most of the popular micros.

Bob Sleigh & Bio for the TI99/4A has two programs on one cassette. In *Bob Sleigh* you must guide your sleigh down a twisting track. There are four track widths and four speeds available.

Bio produces your biorhythm charts for any 30-day period.

Program	*Bob Sleigh & Bio*
Price	*£4.50*
Micro	*TI99/4A*
Supplier	*Byteware Ltd*
	Unit 25
	Handyside Arcade
	Newcastle upon Tyne
	NE1 4PZ

COSMIC

Stix, based on the arcade game *Qix*, does not involve space invaders, mutant camels or laser cannons.

Instead, *Stix* consists of a bundle of energy that 'roams the universe, destroying all in its path'. But, a freak cosmic storm has trapped the *Stix* in hyperspace, giving you the chance of controlling it by enclosing it with force fields.

The game can be played with joysticks, or direct from the keyboard.

Program	*Stix*
Price	*£9.20*
Micro	*Commodore 64*
Supplier	*Supersoft*
	Winchester House
	Canning Road
	Wealdstone
	Harrow
	Middlesex HA3 7SJ

PARCHMENTS

Invincible Island from Richard Shepherd Software is one of the company's first games not actually written by Richard Shepherd.

Peter Cooke, author of *Invincible Island*, has constructed an interesting split-screen graphic and text adventure for the 48K Spectrum. Ancestral home of the mysterious Xaro tribe, the island of the title contains 'unimaginable treasures'. But, before you can find the treasure, you must first discover the seven parchments of Xaro.

I must admit to being a little disconcerted to find that I usually did no better than 'you have scored a pathetic 0'. But, there is a useful Help facility, though unusually it cannot be used during a game.

All in all, a very creditable addition to the Richard Shepherd stable. But, I must admit I am waiting to see if the next release is Invisible Island by Dudley Moore.

Program	*Invincible Island*
Price	*£6.50*
Micro	*Spectrum 48K*
Supplier	*Richard Shepherd Software*
	Elm House
	23-25 Elmshott Lane
	Cippenham
	Slough
	Berkshire

WORLD RULER

Wargamers are a dedicated breed, always ready to spend hours pondering over the precise meaning of some new tactical advance by their fellow players — and using rule books more complicated than the most erudite ZX80 programming manual.

Computers are a useful tool for wargamers, since a typical game requires writing down all sorts of information, keeping track of things like supplies, power levels, etc.

One of the leaders in the area of putting wargames on computers is Red Shift.

State of the art for this kind of game may very well be *Apocalypse* which, not eschewing big themes, allows you to become a world leader and rule the world — using nuclear force if necessary.

The game comes with four maps depicting various parts of the world you may wish to dominate and an elaborate instruction booklet. Since the game is likely to last at least four hours, there is a *Save* option.

Program *Apocalypse*
Price *£9.95*
Micro *Spectrum 48K*
Supplier *Red Shift*
12c Manor Road
Stoke Newington
London N16

GOLD MINE

Latest offering from Welsh software house Abacus is *Super Digger*.

The plot is simple — you are working down a gold mine when suddenly you find yourself surrounded by hungry man-eating monsters. Armed with a pick-axe, you must dig traps to catch the monsters, or bash them over the head. But, be warned, sometimes the monsters will leave proximity mines which explode when you walk over them.

Those of you with delicate sensibilities should also know that the monsters are lacking in table manners — after chomping on your bones, they are apt to burp.

Program *Super Digger*
Price *£5.95*
Micro *Spectrum 16K*
Supplier *Abacus*
716 Llangyfelach Road
Treboeth
Swansea SA5 9EL

POSTMAN

Perilous Post sounds like a kind of *Frogger*. As the postman you must deliver a parcel to a house flashing red at the top of the screen.

Your simple task is fraught with danger, as first you cross railway lines then negotiate the river using boats and finally avoid the traffic wardens.

You have a time limit for the delivery of each parcel (if only it were true) and are awarded a new van for every 10,000 points.

Program *Perilous Post*
Price *£6.50*
Micro *Vic20*
Supplier *Impact Software*
70 Redford Avenue
Edinburgh EH13 0BW

COPTER RESCUE

Byteware is offering a range of games for several machines including the TI994/A and the Commodore 64.

It is interesting to note that Texas games seem to be far less often written in machine code than is the norm for other machines — perhaps because of the difficulty of getting hold of technical information from Texas?

Writing in Basic another problem crops up, because there is a difference between Texas Basic and Texas Extended Basic such that the best games require the latter. For those people who have the Extension module, Byteware has a couple of programs that utilise its extra facilities.

Copter Captive first requires you to collect keys and escape from a room whilst avoiding your captors. If you can escape, you must use your helicopter to rescue your troopers — this is achieved by colliding with them.

Program *Copter Captive*
Price *£7.95*
Micro *Texas TI994A (Extended Basic)*
Supplier *Byteware Unit 25 Handyside Arcade Newcastle-upon-Tyne NE1 4PZ*

3D MOVIE

Silly Software seem to want to be a sort of Automata for the Dragon.

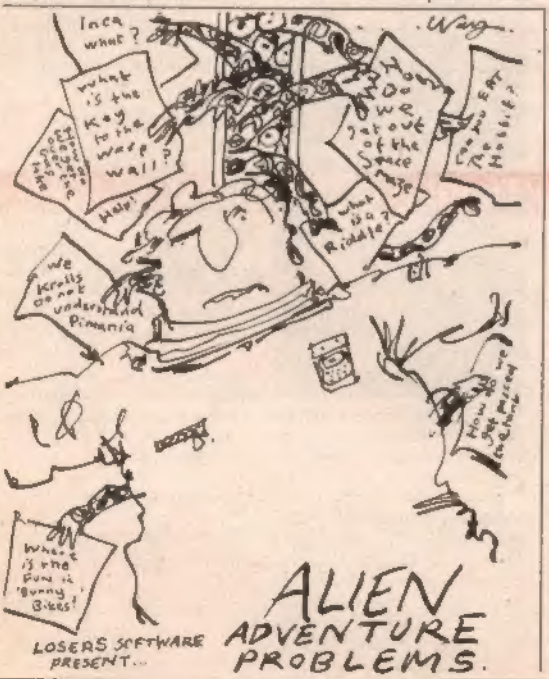
Its first release is entitled *Movie Producer* and it has 3D graphics — on the cover of the cassette! Included with the actual program are a pair of red and green glasses that enable you to see the cover in 3D.

It appears to be a sort of adventure game. As ever, the objective is to accumulate money and power, but here you achieve it by making a film.

The game begins in Wardour Street, where you must first try to sell your script. Having sold it, you must then make your movie, each day costing you 500 dollars.

The game features graphics and music as well as (to be taken with a modicum of sodium carbonate, I think) a claimed 25 billion levels of play.

Program *Movie Producer*
Price *£7.95*
Micro *Dragon 32*
Supplier *Silly Software*
61 Tornhill
North Weald
Epping
Essex



Ziggurat

Grammar gripe

Grammar, n. A system of pitfalls thoughtfully prepared for the feet of the self-made man, along the path by which he advances to distinction.

The Devil's Dictionary by Ambrose Bierce

When it comes to writing I am very particular about the words I use.

I don't like the use of contractions such as "can't" because they're clumsy and possibly reveal a lack of command of English, and we're only too aware that that leads to inclarity ▩ thought. The ending of sentences by a preposition is also something I can't put up with.

Another rule to follow is never to use exclamation marks! And NEVER to capitalise. And never start a sentence with a conjunction. But that's only sensible, isn't it!

A pet hate, and its all around us in it's misuse, is the confusion between "it's" (which is short for "it is", and thus its wrong to use it anyway), and "its" (which means "belonging ▩ it", that is it's definition).

Always a verb in a sentence.

Examples of misuse are everywhere, and it can sometimes be important. Some word-processing packages now offer help with spelling, and one in use with the US Army also helps with simple grammar. The simple grammar is needed to help write manuals that the semi-illiterates amongst the draft might possibly understand.

Having an army which contains people who are not able to distinguish between buttons marked "Do not press, explosive" and "Coffee, white with sugar" must be worrying.

How can you obey orders if you cannot read them, never mind understand them?

In *Communications Management* (August 1983), in a feature about telecommunications satellites, I read: "It is now ▩1 years since the world's first experimental commercial communications satellite, Telstar I, provided direct exchange of television broadcasting across the Atlantic, some five years after, the USSR put Sputnik I into orbit."

I have no quarrel with the feature, indeed it was interesting. But consider the short quotation, and see what a computer might do. A computer would do nothing — the sentence is grammatically correct and clear in meaning.

The meaning is not, however, that intended by the author (or so I hope).

As the sentence reads, Sputnik was launched five years after Telstar ". . . some five years after, the USSR put Sputnik I into orbit".

I know, and you know, that Telstar came five years after Sputnik, and that was what was meant by the author. Somewhere between the author having his idea to talk of Sputnik and the words appearing in the magazine, an extra comma intruded.

How did we know what the author was meaning, even though it did not so appear? Experience, and knowledge of the worlds, a personal database of inconsidered trifles.

Any computerised system would be useless when faced with such a problem — for a start the computer would not realise there was a problem.

A computerised system to correct spellings and/or grammar is a simple expert system — working on probabilities and fuzzy logic — but the world of words is so vast that a computer cannot truly cope. Many would maintain that our language is really our society in a different form (eg, George Orwell in *1984*).

An expert system works with a set of rules, a set of conventions. Usually I — for example — follow the conventions of what is normally termed "grammar". Sometimes, for effect, I transgress those conventions. How is an expert system to know which transgressions are intended, and which are not? It is a convention that some conventions will be observed and others will be transgressed.

There are two forms of reading, or understanding: "efferent", where the object is to acquire information as quickly as possible, and "aesthetic", where the whole point is the experience of the reading or understanding itself.

Expert systems might be better at coping with efferent texts (eg, manuals) than with aesthetic texts (eg, novels, or — worse still — my outpourings . . .). ■

Boris Allan

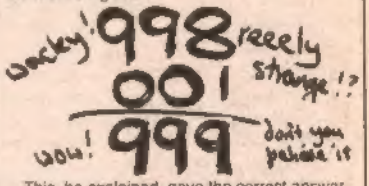
Puzzle

A rare breed

Puzzle No 73

Walter was one of that rare breed of wacky mathematicians!

He would never do things the conventional way if it could be avoided. When once asked to work out the square root of 998001 he simply divided the six-digit number in half and added the halves together.



This, he explained, gave the correct answer.

How many other six-digit numbers can have their square roots evaluated ▩ this wacky way?

Solution to Puzzle No 68

Answer: 10, 4 and 9, and 5, 6, and Queen were the cards dealt.

Let us call the first three cards *A, B* and *C*, and the second three *D, E* and *F*. Also, *A* will denote the highest card.

So,

$$A + B + C = D + E + F$$

and

$$A * B * C = D * E * F$$

As all values are in the range 1 to 13 and ▩ are different, the following program tests ▩ possible permutations of cards.

```
10 FOR A = 8 TO 13 20 FOR B = 1 TO A - 1 30 FOR
C = 1 TO A - 1 40 IF B = C THEN GOTO 140 50 FOR
D = 1 TO A - 1 60 IF B = D OR C = D THEN GOTO
130 70 FOR E = 1 TO A - 1 80 IF B = E OR C = E
OR D = E THEN GOTO 120 90 LET F = A + B + C -
(D + E) 100 IF F = A OR F = B OR F = C OR F = D
OR F = E OR F < 1 THEN GOTO 140 110 IF A * B * C
= D * E * F THEN PRINT A;" ";B;" ";C;" ";D;" ";E;" ";F 120
NEXT E 130 NEXT D 140 NEXT C 150 NEXT B 160
NEXT A
```

From the possible sets of values printed, there are two sets with a five present: (10, 4, 9)-(5, 6, Q) and (5, 4, Q)-(3, 8, 10). So you will still have ▩ use a little bit of telepathy to see inside the demonstrator's mind.

Winner of Puzzle No 68

The winner is: N Wheeler, Cavendish Road, Sutton, Surrey, who receives £10.

Top 10

Spectrum

1	(1)	Jet Pac	(Ultimate)
2	(—)	Scrabble	(Psion)*
3	(2)	Flight Simulation	(Psion)*
4	(3)	Horace and the Spiders	(Psion/Melbourne House)
5	(8)	Transylvanian Tower	(Richard Shepard)*
6	(7)	Horace Goes Skiing	(Psion/Melbourne House)
7	(4)	Football Manager	(Addictive Games)*
8	(6)	The Hobbit	(Melbourne House)*
9	(10)	Alchemist	(Imagine)
10	(—)	Pssst	(Ultimate)

*Requires 48K

(Figures compiled by W H Smith and Sons, London)

Atari

1	(2)	Diamonds	(English Software)
2	(1)	Miner 2049er	(Big Five)*
3	(—)	Hellcat Ace	(Microprose)
4	(3)	Curse of Crowley Manor	(Adventure International)
5	(—)	Fire Fleet	(English Software)*
6	(8)	Orc Attack	(Thorn EMI)*
7	(—)	Air Strike	(English Software)†
8	(9)	Chaplifter	(Broderbund)*
9	(7)	The Blade of Blackpoole	(Sirius)‡
10	(5)	Zaxxon	(Datasoft)

‡42K Disc. *Cartridge. †32K Cassette

(Figures compiled by Calisto Computers, Birmingham 021-632 6458)

Dragon

1	(1)	The King	(Microdeal)
2	(2)	Frogger	(Microdeal)
3	(3)	Talking Android Attack	(Microdeal)
4	(6)	Night Flight	(Salamander)
5	(5)	Shuttle	(Microdeal)
6	(4)	Space War	(Microdeal)
7	(—)	Morocco Grand Prix	(Microdeal)
8	(10)	Ring of Darkness	(Wintersoft)
9	(—)	Katerpillar Attack	(Microdeal)
10	(7)	Planet Invasion	(Microdeal)

(Figures compiled by Boots & Co. London)

BBC

1	(1)	Felix in the Factory	(Program Power)
2	(—)	Super Invaders	(Acornsoft)
3	(2)	Danger UXB	(Program Power)
4	(3)	3D Bomb Alley	(Software Invasion)
5	(9)	Great Britain Limited	(Simon W Hessel)
▩	(5)	Starship Command	(Acornsoft)
7	(—)	Centipede	(Superior Software)
8	(—)	Feasibility Experiment	(Digital Fantasia)
9	(—)	Demon Decorator	(Program Power)
10	(7)	Alien Swirl	(Program Power)

*All model B

(Figures compiled by Micro Management, Ipswich 0473 59181)

Vic20

1	(1)	Arcadia	(Imagine)
2	(2)	Skyhawk	(Quicksilva)
3	(4)	Wacky Waiters	(Imagine)*
4	(3)	Cosmic Crunch	(Commodore)*
5	(6)	Gridrunner	(Llamasoft)
6	(8)	Panic	(BugByte)
7	(9)	Sargon II Chess	(Commodore)*
8	(7)	Cosmads	(BugByte)
9	(5)	Catcha Snatcha	(Imagine)
10	(10)	Frantic	(Imagine)

*Cartridge.

(Figures compiled by Boots & Co. London)

Books

1	(1)	Complete Spectrum Rom Disassembly, *Logan and O'Hara*	(Melbourne House)
2	(3)	Commodore 64 Machine-code Master, *Lawrence and England*	(Sunshine)
3	(4)	Assembly Language Programming for the BBC Micro, *Bembaum*	(Macmillan)
4	(2)	Structured Programming With BBC Basic, *Atherton*	(Horwood)
5	(8)	Complete Forth, *Winfield*	(Sigma)
6	(—)	BBC Micro Book, Basic, Sound and Graphics, *McGregor and Watt*	(Addisson-Wesley)
7	(—)	Programming the 6809, *Zaks*	(Sybex)
8	(6)	Spectrum Hardware Manual, *Dickens*	(Melbourne House)
9	(7)	Z80 Assembly Language Programming, *Leventhal*	(Osbourne)
10	(—)	Anatomy of the Dragon, *James*	(Sigma)

(Figures compiled by Watford Technical Books, Watford 0923 23324)

(Last week's position in brackets)

ZX81*

1	(9)	Chess	(Psion)
2	(1)	Space Raiders	(Psion)
3	(2)	Espionage Island	(Artic)
4	(3)	Flight Simulation	(Psion)
5	(4)	Fantasy Games	(Psion)
6	(7)	Football Manager	(Addictive Games)
7	(5)	Defender	(Quicksilva)
8	(5)	1K Games	(Artic)†
9	(—)	Asteroids	(Quicksilva)
10	(—)	QS Invaders	(Quicksilva)

*All 16K except where shown. †Runs in 1K.

(Figures compiled by Boots & Co. London)

DEAR AUTOMATA, DESPITE YOUR VERY SILLY ADVERTISING, I AM ORDERING THE FOLLOWING FINE COMPUTER SOFTWARE FROM YOU!!

GO TO JAIL	(Spectrum 48K) @ £6	
PIMANIA	(Spectrum 48K) @£10	
PIMANIA	(Dragon 32) @£10	
PIMANIA	(BBC Micro 32K) @£10	
PIMANIA	(ZX81 16K) @ £5	
BEST POSSIBLE TASTE	(ZX81 1K) @ £5	
THE BIBLE	(ZX81 1K) @ £3	
CAN OF WORMS	(ZX81 1K) @ £3	
DRAGON DEMOS	(Dragon 32) @ £5	
BUNNY + E.T.A.	(Spectrum 16K) @ £5	

I enclose the right money TOTAL..... £

or please charge my ACCESS CARD / EUROCARD / MASTER CARD

CARD NUMBER

my signature.....

my name.....

my address.....

.....

.....POST CODE.....

send to: AUTOMATA U.K. LTD. 27 HIGHLAND ROAD PORTSMOUTH, HANTS. PO4 9DA, ENGLAND

all prices include VAT, packing & postage within the U.K. please add 10% to total price for overseas orders. Trade enquiries are welcome. Please leave the following space blank for DESPATCH NUMBER:

.....

PIMAN EXPANDS

To celebrate the PIMAN's return to normal service, after your heartwarming response to his prickly pleas for original software to market, we at AUTOMATA are buying the little cult some new premises! In our mission to spread joy and happiness across the planet, we are moving into a dinky retail software outlet, (Dorothy's Woolshop, honest..), down here in Pi-eyed Portsmouth. Our friendly little shop, zany whacky offices, 17 tons of rubble, garden full of a red setter and exotic weeds, not to mention Lurch The Office Parrot (I told you not to mention Lurch The Office Parrot) are at the **NEW ADDRESS** printed above this week's Krummy Kartoon Strip. So will our customer please write it down next time they allow you a sharp object in that wierd hospital. We'll be selling exciting specially selected excellent software cassettes and our staff are highly trained in assisting customers. You know, we're going to have to stop writing this garbage on the back cover of Popular COMPUting Weakly, and adVErTISE A FEW of our wonderful programs. He-hum, maybe next week. I mean who writes this stuff anyway.....it certainly ain't me. By the way, did I ever tell you about the time the Piman met this Israeli man, and they went to a .....CRIPES! IT'S THE MEN IN THE WHITE COATS AGAIN.... gerroffmeeeee

AUTOMATA U.K. LTD.
27 HIGHLAND ROAD
PORTSMOUTH, HANTS
PO4 9DA, ENGLAND

Pardon?

AUTOMATA U.K. LTD.
27 HIGHLAND ROAD
PORTSMOUTH, HANTS
PO4 9DA, ENGLAND

AUTOMATA U.K. LTD.
27 HIGHLAND ROAD
PORTSMOUTH, HANTS
PO4 9DA, ENGLAND

AUTOMATA U.K. LTD.
27 HIGHLAND ROAD
PORTSMOUTH, HANTS
PO4 9DA, ENGLAND